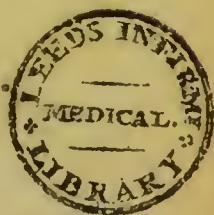


EXPERIMENTS AND OBSERVATIONS
ON A
NEW SPECIES OF BARK,
SHEWING ITS GREAT EFFICACY IN
VERY SMALL DOSES:
ALSO A
COMPARATIVE VIEW
OF THE POWERS OF THE
RED AND QUILLED BARK;
BEING AN ATTEMPT TOWARDS A
GENERAL ANALYSIS
AND
COMPENDIOUS HISTORY
OF THE VALUABLE
GENUS OF CINCHONA,
OR THE
PERUVIAN BARK.



BY RICHARD KENTISH, M.D.
MEMBER OF THE ROYAL MEDICAL SOCIETY.
AT EDINBURGH,
CORRESPONDENT MEMBER OF THE SOCIETY
OF SCOTTISH ANTIQUARIES, &c. &c.

Amicus Plato, amicus Socrates, sed magis amica veritas.

L O N D O N:
PRINTED FOR J. JOHNSON, (NO. 72) ST. PAUL'S
CHURCH-YARD. 1784.

ERRATA.

Page 16, line 15, *dele* with fixed alkalies.

36, 6, *after* circumst. *read* same.

44, 24, *read* Lucia.

50, 3, *for* that I forgot, *read* as to make me forget.

37, 4, in the note, *for* this mixture, *read* the latter.

46, 11, *read* should the period of its fame ever arrive.

64, 22, to two—the liquor then strained.

TO

DR. JOSEPH BLACK,

PROFESSOR OF CHEMISTRY IN THE
UNIVERSITY OF EDINBURGH.

SIR,

WHATEVER may be the motives of the present dedication, the greatness of your character will acquit me of the crime of flattery.—He who has not had the advantage of your instruction, has lost an opportunity of improvement which in vain is sought from others.—He who has profited by it will feel a conscious pleasure; and he who possesses your esteem and friendship, enjoys a happiness, which

to preserve, shall be the pride and
constant endeavour of,

S I R,

With the most unfeigned respect and gratitude
for all public and private favors,

Your most obliged,

obedient, and

very humble servant,

Huntingdon,
Sept. 8, 1784.

RICHARD KENTISH.

P R E F A C E.

THE Author cannot send this publication into the world without apology. The subject is important, and deserves attention from the friends of science. A new remedy cannot be introduced into general practice by the labours of an individual, the concurrence of practitioners is necessary; and the united efforts of physicians are required, to establish the reputation of a new medicine. The author has here endeavoured to discharge the duties of his profession, and of society. He has attempted to improve the science of physic, by the addition of a powerful remedy. He has attempted to illustrate the nature of a vegetable, which had been misrepresented; and to ascertain the action of a medicine,

cine, which false theory had obscured. His performance, not his endeavour, needs apology; and he trusts the candour of judicious criticism will overlook the execution in the merit of attempt.

The present situation of the author is a great inducement to the publication of his observations. The country where he now resides, is peculiarly infested with intermittents, remittents, and other diseases in which the bark has been esteemed efficacious; and from the accounts of the medical practitioners, no part of his Majesty's subjects annually consume more bark than the inhabitants of *Huntingdonshire*. This consideration has induced the author to pay particular attention to the diseases of a country, where he means to practise

ἐπιβλέπειν ἐν δεῖ καὶ χῶρην, καὶ ὥρην, καὶ ἡλικιήν καὶ νεσῶς
ἐν ἡσὶ δεῖ, ἢ ἔ*.

The great advantages which will result from the general introduction of the *Cinchona Sanctæ Luciæ* into general

practice, are very manifest. Its importation into this kingdom will be readily obtained, its price will be trifling, and the smallness of its dose will be its principal recommendation. Few stomachs will revolt at the sight of gr. v. or gr. x. of a powder; but English stomachs are in general too delicate to bear whole drams thrown down at once, which has been the case with the quilled and red species of cinchona.

To consume more time in preface would be unpardonable. The author therefore submits to the examination of *candid criticism* the following thoughts, which, whatever be their fate before the public tribunal, he trusts that it will not lessen that esteem, of which he is proud to boast from a scientific few. “ It is the duty of every man, “ to endeavour that something may be “ added by his industry to the hereditary aggregate of knowledge and “ happiness. To add much can indeed “ be the lot of few; but to add something, however little, every one may hope;

“ hope ; and of every honest endea-
 “ vour, it is certain, that, however
 “ unsuccessful, it will be at last re-
 “ warded.” Rambler, No. 129.

C O N T

C O N T E N T S.

S E C T I O N I.

ON THE CINCHONA OFFICINALIS, OR
QUILLED-BARK.

C H A P. I

*Introduction—Vegetable Arrangement—and
General History.* I

C H A P. II.

Experiments on the Cinchona Officinalis. II

C H A P III.

*Conclusions from the Experiments on the Cinchona
Officinalis.* 21

SECTION II.

ON THE CORTEX RUBER, OR RED PERUVIAN BARK.

CHAP. I.

The History of the Red Bark—Reasons for believing it to be the Produce of the same Tree as the Quilled—Arguments in Favor of its being a different Species of the Genus Cinchona. 25

CHAP. II.

Experiments on the Red Peruvian Bark 23

CHAP. III.

Conclusions from the Experiments on the Red Bark. 42

CHAP. IV.

On the Medical Effects of the Red Bark. 46

S E C T I O N III.

ON THE CINCHONA SANCTÆ LUCIÆ,
QUINQUINA-PITON, QUINQUINA DE LA
MARTINIQUE, CARIBBÆAN, OR NEW-
BARK.

C H A P. I.

The History of the Cinchona Sanctæ Luciæ.

51

C H A P. II.

*Experiments on the Cinchona Sanctæ Luciæ,
or Caribbæan Bark.*

58

C H A P. III.

*Conclusions from the Experiments on the Cinchona
Sanctæ Luciæ.*

66

C H A P. IV.

*On the Medical Effects of the Cinchona Sanctæ
Luciæ.*

73

S E C T-

S E C T I O N IV.

GENERAL OBSERVATIONS ON THE BARK.

C H A P. I.

On the Preparations of Bark. 90

C H A P. II.

On the Action of the Bark. 97

C H A P. III.

On the Use of the Bark in Disease. 104

EXPERIMENTS AND OBSERVATIONS
ON THE
GENUS OF CINCHONA,
OR THE
PERUVIAN BARK.

SECTION I.

ON THE CINCHONA OFFICINALIS, OR
QUILLED-BARK.

CHAP. I.

*Introduction—Vegetable Arrangement—and
General History.*

EVERY age of Medicine has had its favourite remedy, and every school of Physic has added something to the increase of the *Materia Medica*; the articles of which, like the instruments of mechanics, have been multiplied and diversified, whilst
B the

the principles on which they acted were altogether unknown, or misunderstood. Remedies have been handed down from the days of Hippocrates with unremitting care; and as if the study of physic consisted in “culling simples,” volumes have been written on articles which time has made obsolete, and reason laid aside. The botanists boasted simple specifics; the chemists their compound panaceas. Thus has the science of medicine been styled an art, and the art of healing supposed to consist in the knowledge of drugs, or the possession of secrets. Philosophy has alternately lent her assistance to the introduction and expulsion of such opinions. Experiments have been cultivated, and experience has confirmed their utility; but mistaken notions of the animal œconomy have placed too great confidence in these researches, and even chemical investigation has been productive of false theory and futile practice.

Shall we not then presume to enquire into the nature, principles, or *modus operandi* of medicines? Is every search after causes vain? Is human knowledge so confined? Is the *capacity* for science so small, that we must
rest

rest satisfied with ignorance, and shut the avenues of wisdom? Heaven forbid! Though ultimate causes may for ever escape human eyes, yet enquiry is the privilege of reason; and the examination of effects, as causes of other effects, will tend to improve the heart, and enlighten the mind. Knowledge is the attribute of Deity, and the characteristic mark of man; it is what places him above other animals, sets him at the head of creation, and makes him lord of all. “*Quid enim est per Deos optabilius sapientia? Quid homini melius? Quid homine dignius? Hanc igitur qui expetunt philosophi nominantur; nec quidquam aliud est philosophia, si interpretari velis, quam studium sapientiæ.*” Cic. de Off. 1. 2.

The present age is happy in an improved philosophy; and as every system of philosophy has had its contemporary system of physic, so is medicine peculiarly fortunate in these days, to have received improvements, and verged towards perfection. The last fifty years have added more to the healing art, than five preceding centuries. Physiology has been explored, pathology improved,

and principles in medicine, like principles in philosophy, attempted. Mistaken notions of diseases have been detected, practice corrected, and theory improved. The specifics, the panaceas of former ages, have sunk into oblivion. One, but one of the vegetable tribe remains, to which modern practice allows the name: this perhaps is usurped, and custom, not experience, sanctions the appellation. Of words I will not dispute. Whether *the Bark* is a catholicon, or entitled to the name of specific, at present is of no importance: its efficacy has established its reputation, and my experiments tend not to defame it.

So much has been already written upon this drug, that it may seem to require apology from any one who shall attempt to pursue the subject. Every medical practitioner, every dabbler in physic, nay every *old woman* in the country, knows the use of bark. It may therefore appear mispent time, and an affront to the literati of the present age, to suppose that my performance will be read: “Omnibus enim temporibus fama & opinione vulgi, sagæ & aniculæ & impostores,
“ medi-

“ medicorum quodammodo rivalet fuere, &
 “ de curationum celebritate cum iisdem fere
 “ certarunt.” Verulam, l. iv. c. 2.

Were my observations confined to the common species of cinchona, I should indeed be open to censure, and liable to be thought presumptuous; but my experiments have not been so confined. I have attempted to lay down clear ideas respecting one species now much in use, but the nature of which has been misunderstood, and a species likewise hitherto entirely unnoticed by English writers has been the object of my enquiry.

Not therefore to spend more time in apologizing for my performance, which must live or die by its own merit, I shall proceed to the first part of my work, and offer from Linnæus a botanical description of the genus of cinchona, or the Peruvian bark.—The tree which produces this bark is classed among the Pentandria Monogynia, and the following is given as its definition.

Cinchona: *Quinquina* Condamin. Act. Gall. 1738.

Cal. Perianthium Monophyllum, superum, quinquef. minim. persistens.

Cor. Monopetala, infundibuliformis. Tubus cylindraceus, longus. Limbus patulus, quinquef. acutus.

Stam. Filamenta quinque minima, antheræ oblongæ intra faucem corollæ.

Pist. Germen subrotund. inferum. Stylus longitudine corollæ-stigma crassiuscul. oblongum simplex.

Per. Capsula subrotunda, Calyce coronata bilocularis à basi versus apicem bifariam dehiscens.

Sem. Plurima, oblonga, compressa, marginata.

Obf. Flos interdum demit quintam partem numeri in singulis partibus.

Such is the character of the genus, and of the species Linnæus enumerates but one, *Cinchona* (officinalis) panicula brachiata, L. Sp. Pl. 244.

If we are not mistaken, we are at present acquainted with two other species, but we shall speak first of the officinalis or *quilled Peruvian Bark*. Several authors have given the history of this article; we shall prefer that of Neumann, which we shall beg leave to give in his own words, “Cortex Peruviani
“anus,

“ anus, called from its efficacy against inter-
 “ mitting fevers Febrifugum Peruvianum,
 “ cortex antifebrilis & antiquartius; and from
 “ a cure performed by it on the lady of
 “ Count del Cinchon, viceroy of Peru, cor-
 “ tex china china, or chinchina, kinkina,
 “ quinquina, comitissæ, &c. was first brought
 “ into Europe in the year 1649, by Cardinal
 “ de Lugo, who was then the Spanish vice-
 “ roy in the West Indies. It continued for
 “ some time a very lucrative secret in the
 “ hands of the Jesuits, who reduced it into
 “ powder, the better to disguise it, and sold it
 “ for its weight in gold: whence its names
 “ Pulvis Jesuiticus, Pulvis Patrum, Pulvis
 “ Cardinalis de Lugo*. The tree called
 “ by

* “ Ce ne fut comme on fait, qu'en 1649, que l'on
 “ commença à avoir quelques notions du quinquina par
 “ les relations du Cardinal de Lugo & des Jesuites à leur
 “ retour en France. Trente années s'écoulerent encore
 “ depuis cette époque avant que les medecins se determi-
 “ nassent à le prescrire aux malades avec cette confiance
 “ que meritent en général les specifics & qu'il a acquis
 “ depuis. En 1679 un Anglois nommé Talbot, le mit
 “ en vogue, & Louis le grand acheta de lui la maniere de
 “ le prescrire & ses doses. Depuis cette époque jusqu' à
 “ ce jour le Perou seul étoit en possession de fournir du
 “ quinquina à l'Europe, & on n'avoit point encore fait

“ by Ray Arbor febrifuga Peruviana, china
 “ china, & quinquina & ganaperide dicta,
 “ is plentiful on the hills near the city Loxa,
 “ in the province of Quito in Peru. It is
 “ said that the trees which grow at the
 “ bottom of the hills have the thickest bark,
 “ smooth and whitish on the outside, clear
 “ or yellowish brown within, the least bitter
 “ and of the least virtue; that the bark of
 “ those on the top is somewhat bitterer,
 “ thin, full of protuberances, of a blackish
 “ colour on the outside, and of a dark brown
 “ within. That those produced about the
 “ middle height yield the bitterest and best
 “ bark, not so smooth and pale coloured as
 “ the one, nor so rugged and dark coloured
 “ as the other. Vaillant, a celebrated bota-
 “ nist at Paris, assured me that he knew six
 “ sorts, and confirmed the account given by
 “ Lemery* and Pomet, that Potosi affords
 “ the

“ usage de celui qui croit dans d'autres contrées. Il en
 “ existoit cependant à Saint Domingue, dans le Nouveau-
 “ Mexique & à la Martinique.” Vid. Journ. de Phys.
 Mars. 1781. (M. Mallet.)

* “ Est l'écorce d'un arbre apellè kinakina ou canna-
 “ perida, qui croit au Perou dans la province de Quito,
 “ sur

“ the best ; that this is much browner,
 “ bitterer, more aromatic and more pungent,
 “ than the bark of Quito. But our business
 “ is to chuse the best of what is brought to
 “ us. This is externally of a blackish brown,
 “ and internally of a dark cinnamon colour,
 “ somewhat unequal on the surface ; com-
 “ pact, firm, and not easy to break ; of a
 “ moderately bitter, astringent taste, with a
 “ mixed kind of aromatic and musty flavour.
 “ The large thick pieces are seldom good.
 “ Those which are rolled up into quills like
 “ cinnamon, are apt to have foreign matters
 “ lodged within, and therefore should be
 “ broke and examined before we pulverize
 “ them for use.” Vid. Lewis’s edit. of
 Neum. Chem. p. 90.

“ sur des Montagnes proche la ville de Loxa ; il est à peu
 “ près grand comme un cerisier : ses feuilles sont rondes,
 “ dentelées, sa fleur est longue, de couleur rougeatre, elle
 “ est suivie d’une gousse qui contient une amande plate,
 “ blanche, envelopée d’une membrane mince. Il y a deux
 “ espèces de kinakina, l’un est cultivé & l’autre sauvage,
 “ le cultivé est de beaucoup preferable à l’autre, les
 “ Espagnols l’appellent palo de calenturas, c’est-à-dire le
 “ bois des fievres.” Vid. Lemery’s Dictionnaire ou Traité
 Universel des Drogues Simples, p. 287.

The conciseness of this history will probably be a recommendation, and I shall be excused from entering more minutely into circumstances which border greatly on conjecture. Accident has given rise to the introduction of many remedies; and the story of an Indian being cured of an ague by drinking at a pond, into which some trees of the cinchona had accidentally fallen, wears some degree of probability, as we are well acquainted with the good effects of a cold infusion: but whoever wishes to investigate more fully the history of this article, may consult the authors on this subject, the principal of whom are comprized under the following:

SYNONIMA OF THE B A R K.

Cortex. Cortex Peruv. china china, quinaquina offic. Arbor febrifuga peruviana, *Jonf. de Dr.* 476. Arbor febrifuga peruviana: China chinæ, & quinquina, & gannana peride dicta: Hispanis palos de calentura: Cortex arboris, Cortex peruvianus vulgo dicitur, inque pulverem redactus, pulvis patrum (scilicet jesuitarum) & pulvis Cardinalis de Lugo; Angliæ the Jesuit's Powder, *R. II.*

1796. China chinæ, Schroederi, App. p. 30. Cortex peruvianus, seu china chinæ, Morton, pyrit. elog. exercit. 1. c. vij. Cortex peruvianus, peruanus, China chinæ, quinquina offic. Dale 291. Kina-kina, Cortex peruvianus, & cortex febrifugus offic. Vulgo Quinquina, Geoff. Mat. Med. 11. 179. Arbre de quinquina, Mem. Acad. R. 1738, p. 319. Cinchona Lin. G. P. 1021, p. 526. The Jesuit's bark, or the bark, or Peruy. bark. Vid. Quinaquina, Alston's Lect. on Mat. Med. Lect. 47. p. 11. Vol. II. by Dr. Hope. Kinakina, kinaquina, chinachina, chinacanna, Lemery, p. 287.

C H A P. II.

Experiments on the Cinchona Officinalis.

I SHALL esteem it altogether unnecessary to present a detail of the labour of others on this subject. Mr. Boulduc, Lewis, and Dr. Percival have thrown considerable light on this and other articles of the Materia Medica, but I know of no author that has given the general analysis which I here attempt. Of what has already been done, I shall

shall have to take notice in different parts of this work, and shall therefore proceed to relate my experiments in the following order :

WITH WATER.

Exp. 1. Half an ounce of the best common Peruvian Bark, reduced to fine powder, was infused twenty-four hours in eight ounces of pure distilled water. The infusion was of a light, yellowish brown colour, and had a pleasant, aromatic, astringent, and slightly bitter taste *.

WITH WATER AND HEAT †.

Exp. 2. Half an ounce of the same bark in coarse powder, was boiled in one pound and

* M. Mallet, whose name we shall have frequent occasion to mention under the article quinquina-piton, has given us some experiments on the common species of the bark, with which we shall here present the reader.

“ 1. Deux onces de quinquina du perou grossièrement
 “ pulvérisé, mis en macération dans deux pintes
 “ d’eau froide, le mélange souvent & fortement agité
 “ pen lant huit jours, il s’en degagea une grande quantité
 “ d’Air qui produisit une mousse abondante. Cette
 “ liqueur filtrée par un papier gris, parut jaunatre, louche
 “ & amère.”

† “ 2. Une chopine d’eau bouillante, versée sur le résidu
 “ et filtrée, douze heures après, donna une liqueur, plus
 “ jaune

and an half of pure distilled water, to half a pint, then passed through a linen cloth and set in a cool place. In twenty-four hours the liquor was found more opake than in the former experiment.; of a beautiful yellow, brown colour, and of a much more bitter taste. A copious precipitation was observed at the bottom of the vessel.

“ jaune & plus amère, la même infusion reitée fournit
 “ une liqueur à peu près semblable.”

“ 3. Le même résidu soumis à une ebullition de sept à
 “ huit minutes dans une chopine d'eau, & reitée trois
 “ fois, le produit des deux premières decoctions étoit
 “ d'un jaune foncé, trouble d'une saveur amère & le pro-
 “ duit de la troisième, étoit plus foible à l'oeil & au gout
 “ que les deux autres.”

“ 4. Le même résidu, après avoir été arrosé d'eau
 “ bouillante versée à plusieurs reprises, jusqu' à lui oter
 “ toute saveur, fut mis en digestion dans un peu d'esprit
 “ de vin, auquel il donna une couleur ambrée sans amer-
 “ tume : on mit ensuite le feu au résidu, qui brula très
 “ promptement sans repandre d'odeur particulière, & ne
 “ fournit pas un atome d'alkali fixe par l'incineration.

“ 5. Toutes les liqueurs qui ayant servi aux infusions,
 “ & lotions, réunies et formant environ quatre à cinq
 “ pintes furent filtrées, passèrent très lentement, et furent
 “ mises ensuite à évaporer. Elles se troublèrent beaucoup
 “ pendant cette opération, furent refiltrées deux fois; &
 “ enfin, l'évaporation terminée, elles laissèrent sur une
 “ assiette de fayance deux gros d'un extrait sec, brillant,
 “ s'humectant à l'air. Journal. de Physique, Mai 1780.

WITH PROOF SPIRIT.

Exp. 3. One ounce of the same bark in coarse powder, was infused in eight ounces of proof spirit for fourteen days, the vessel being frequently shaken. On examination, it was found of a beautiful dark brown colour, perfectly transparent, and had the bitter astringent taste of bark. On the addition of water, it became turbid, resembling, in appearance, the decoction; and on standing at rest some time, let fall a copious precipitate, leaving the liquor transparent.

WITH ACIDS.

Exp. 4. One scruple of the bark in powder, was infused in *spt. vitrol. ten.* $\bar{3}$ i. for the space of twenty-four hours. On examination, it had acquired very little colour; and when diluted with water, had only an acid taste.

Exp. 5. To one scruple of the same bark was added *aq. fort. dup.* $\bar{3}$ i. In twenty-four hours the whole substance of the bark disappeared, and a yellow matter, something like ambergrise, was found floating on the surface, and sticking to the sides of the vessel. On the addition of water, the taste

was

was only acid, but on the addition of alkali the liquor changed from a yellow to a brown colour, and the bitter taste of the bark was perceptible.

Exp. 6. To one scruple of the same Peruvian bark, was added one ounce of *spt. fal. marin.* In twenty-four hours it had acquired a slight blackish tinge; had no taste of the bark when diluted with water; but on the addition of alkali, a very slight bitter was perceived.

Exp. 7. One scruple of the same bark was infused twenty-four hours in one ounce of *acetum distillatum*, the colour was scarcely changed, and it appeared to possess no properties of the bark.

WITH ALKALIES.

Exp. 8. One scruple of the best common Peruvian bark, in powder, was infused with the same quantity of vegetable alkali, in one ounce of water. In twenty-four hours the infusion was of a beautiful dark brown colour, but had no taste of the bark. The addition of acid produced a slight bitter taste.

Exp. 9. One scruple of the same bark was infused in an ounce of water, with a scruple
of

of fossil alkali. The colour of the infusion and other circumstances, were nearly the same as in the former experiment.

Exp. 10. One scruple of the same bark, in powder, was infused in one ounce of spt. corn. cervi. In twenty-four hours a dark brown pellicle floated on the top of the liquor, which was transparent, and of a brown colour. A kind of precipitation was observed on the sides of the vessel, especially near its bottom. When diluted with water it had no taste of the bark; and on the addition of acid, the bitter taste was less perceptible than in the former experiments.

WITH FIXED ALKALIES.

Exp. 11. To one scruple of the bark, in powder, was added one ounce of spt. sal. ammon. c. calce. In twenty-four hours a beautiful dark brown colour was produced, and something like a deposition or precipitation seemed to have taken place. When diluted with water, no taste of the bark was perceptible; but on the addition of acid, a bitter taste was perceived more manifestly than in any of the former experiments.

WITH

WITH NEUTRAL SALTS.

Exp. 12. One scruple of the bark was infused with one scruple of nitre, in one ounce of water, for twenty-four hours, during which time it had acquired little colour, and less taste.

Exp. 13. Of cream of tartar, and the best common bark, in powder, each one scruple, was infused in one ounce of water for twenty-four hours : the infusion had acquired little colour, but a slight bitter taste.

EXPERIMENTS ON THE SIMPLE INFUSION
OF BARK.

Exp. 14. To two ounces of the infusion, prepared as in Exp. 1. were added gtt. x. of the tinct. martial. A dark inky colour, resembling that with the infusion of galls, and chalybeates, was instantaneously produced, and a copious precipitation was observed, after the mixture had remained at rest some hours.

Exp. 15. To two ounces of the same infusion were added spt. vitriol. ten. gtt. xx. The liquor was rendered turbid, and a slight precipitate was let fall. The acid taste was not considerable.

EXPERIMENTS ON THE SIMPLE DECOCTION OF BARK.

Exp. 16. To two ounces of the decoction prepared as in Exp. 2. and poured off without shaking the phial, after having stood twenty-four hours, were added gtt. x. of the tinct. martial. The black colour and precipitation, were greatly inferior to the same experiment with the infusion.

Exp. 17. To two ounces of the decoction, were added gtt. xx. of spt. vitriol. ten. The acid taste was less prevalent, and the precipitation more copious than in the same experiment with the infusion.

EXPERIMENTS ON THE TINCTURE OF BARK.

Exp. 18. To one ounce of the tincture prepared as in Exp. 3. were added gtt. x. of tinct. martial. The mixture very soon became of a deep inky black colour, and let fall a copious precipitation.

Exp. 19. To one ounce of the same tincture, were added gtt. xx. of spt. vitriol. ten. The mixture was rendered turbid, and a copious deposition ensued.

MISCELLANEOUS EXPERIMENTS.

The following experiment was made, with a view of ascertaining the quantity of resinous extract yielded from the quilled bark.

The experiment was conducted with great care in the laboratory of a druggist in London.

Exp. 20. Four pounds of the best bark, in coarse powder, were put into a large glass retort, to which were added four gallons of rectified spirit of wine. The vessel was then placed in another large vessel of water, over the fire, and kept nearly in a boiling heat for 24 hours.

As the spirit distilled over it was again returned, and the process thus continued till the whole was thought to be fully saturated. It was then evaporated, and *eight ounces* of resinous extract obtained. This is the common method used by the druggists for obtaining the spirituous extract, but was here conducted with particular caution.

Exp. 21. One pound of the best quilled bark, in coarse powder, was boiled in two gallons of water. The liquor filtered and evaporated to the common pilular consistence, was found to yield five ounces, two drams, two scruples, and seven grains of gummy extract.

Exp. 22. One dram of lean raw beef was suspended by a thread in a phial, containing two ounces of the infusion of quilled bark. The meat continued four days perfectly sweet, though it was exposed in a window to a south-west aspect. The same quantity of meat kept in similar circumstances, in two ounces of water, as a standard to this and the other experiments on the red and Caribbæan bark, was putrid in twenty hours. On the fifth day, the beef in this experiment with common bark, began to smell fœtid, and on the sixth was perfectly putrid *.

Exp. 23. Half an ounce of quilled bark: in powder, was infused in four ounces of red-port wine. In four days the colour of the liquor was very little changed. The taste was agreeably bitter, and a black colour produced on the addition of chalybeates.

* This experiment shews, that the infusion of common bark is more antiseptic than either the red or Caribbæan bark. Dr. Saunders informs us, that Mr. Skeete had found the red bark more antiseptic than the common: I have the highest respect for my friend Mr. Skeete's abilities, but must doubt his accuracy in this experiment. I had instituted a set of experiments on the antiseptic powers of the decoctions, but an accident prevented me from drawing any conclusion on the comparative virtues of each.

Exp. 24. Half an ounce of quilled bark in powder, was infused in four ounces of white-port wine. In four days the liquour had acquired an agreeable bitter taste, and struck a black colour with chalybeates.

These are all the experiments which I shall at present relate. Many more were made, and more might be suggested, but the present will answer the purpose of the present enquiry. We shall therefore proceed to lay before the reader, the conclusions which we have deduced, in the following chapter.

C H A P. III.

Conclusions from the Experiments.

WE shall now attempt to draw some conclusions from our experiments, and in this chapter endeavour to investigate the nature and properties of the Peruvian bark. The following appear to us natural inferences.

1. The *cinchona officinalis* is a powerful astringent.

C 3

2. The

2. This principle resides in a gum which is soluble in water, and more readily by cold maceration than coction.

3. The Peruvian bark contains a bitter principle, which is a resin.

4. The astringent gum and bitter resin are so combined, that by the assistance of the former, part of the latter is suspended in water, even by cold maceration.

5. Coction extracts powerfully the resin, though it evaporates or diminishes the astringent principle.

6. Proof spirit dissolves both the astringent and bitter principles, and is the only proper menstruum of the latter.

7. Vinous spirit has the same effect as proof spirit, though in a less degree.

8. Concentrated acids entirely corrode or dissolve the bark. The weaker acids have little effect on the substance of the bark, and when added to its solutions in water or spirit, precipitate its active parts.

9. Common alkalies prevent its solution in other menstrea; volatile alkali does not extract its virtues; and caustic volatile alkali forms but a weak preparation.

10. The

10. The Peruvian bark is a powerful antiseptic. Of what advantage these facts are to medicine, medical practitioners must decide. They differ in some measure from the conclusions which other writers have drawn; but accuracy in experiment, must here be considered as the test of truth. It is with great deference that I mention the respectable authority of Dr. Percival, from whom I am obliged to differ. “ The Peruvian bark, says he, and many other vegetable bitters and astringents, yield their virtues as perfectly to cold, as boiling water.” If the astringent and bitter principles be different, and the latter a virtue of the Peruvian bark, undoubtedly the Doctor has erred in his conclusions. . Again, he says, “ 2. As much of the resin of the bark is dissolved by cold maceration as by coction.” The bitter taste of the decoction, compared with the infusion, is sufficient objection to this conclusion; but the decoctions of the red and Caribbæan bark, put it beyond all doubt, that the bitter principle is more copiously yielded by coction than cold infusion. In the latter species of bark, we have described the presence of the resin so plentiful in the decoction, as to

be precipitated from it in lumps on the addition of acid. The candour of Dr. Percival will readily excuse these remarks, which we shall not attempt at present to enlarge. A comparative view of the powers of the different species of cinchona, will more properly be made in another place; we shall therefore hasten to our experiments on the red bark in the next section.

SECTION

SECTION II.

ON THE CORTEX RUBER, OR RED PERUVIAN BARK.

C H A P. I.

The History of the Red-Bark—Reasons for believing it to be the Produce of the same Tree as the Quilled—Arguments in favour of its being a different Species of the Genus Cinchona.

THE first author who recommended the use of the red-bark, was Dr. Saunders, physician to Guy's hospital in London. His pamphlet has gone through several editions, and the medicine has come into pretty general use. At first sight it may appear absolute scepticism, a kind of arrest on the judgment of practitioners, to hazard one word against this favourite remedy; but public opinion is always liable to public examination, and every unprejudiced person will candidly examine each side of a subject that even admits dispute. Great as that gentleman's fame may be as a chemist and as a teacher of chemistry,

chemistry, I hope to make it appear, that he has been at least mistaken in his account of the red-bark; but we shall not at present speak of its medical or chemical virtues. The natural history of this bark, is at present involved in some obscurity. Its late introduction into this kingdom appears to have been the effect of chance. “ In the year “ 1779,” says Dr. Saunders, “ a Spanish ship “ from Lisbon bound to Cadiz, was taken “ by the Huzzar frigate, and carried into “ Lisbon; her cargo consisted chiefly of this “ bark, some part of which was immediately “ imported into this country, and a considerable quantity was bought at Ostend, “ at a very low price, by some of our “ London druggists. The boxes in which “ it was brought to Europe, were of the “ same kind as those in which the common “ Peruvian bark was contained, and all sold “ by the general title of Quinquina. The “ druggists in whose hands this red-bark at “ first was, found it difficult to dispose of it, “ its appearance was so very unlike that of “ common bark; at last they offered it by “ way of trial, to such apothecaries as resided “ in counties where agues are frequent; the

“ success

“ success attending its use,” adds the Doctor,
 “ soon convinced them of its superior effi-
 “ cacy*.”

There is no doubt but this remedy, soon after its importation into England, was introduced to the attention of medical practitioners ; but as its fame appears now very much upon the decline, we may probably attribute its universal reception more to the notice taken of it by Dr. Saunders in his publication, than the real efficacy of the medicine. The red-bark is in much larger and thicker pieces than the common Peruvian bark. It appears to consist of three distinct layers. The external coat is generally of a reddish brown colour, though sometimes it has a light-coloured appearance, and is covered with a species of lichen or mossy substance. The internal surface is of a deep red colour, and generally of a resinous appearance. The middle layer is generally the thickest, most compact, of the darkest red colour, and appears to contain most resin. The innermost coat has generally the most fibrous appearance, very often is of a bright red colour, and appears woody.

* Vid. Dr. Saunders's pamphlet, p. 16.

In the first edition of his work, Dr. Saunders thought this bark was taken from the larger branches of the same tree that yields the quilled. The chief of his arguments were drawn from the analogy of other barks : thus the larger branches of the oak are said to yield a bark, redder, rougher, and more astringent, than the smaller twigs of the same tree. Tanners are said to prefer the larger oak bark ; and the Doctor says, “ I have
 “ found, by comparing infusions of both,
 “ and submitting them to the most decisive
 “ experiments regarding their astringency,
 “ by adding to them solutions of iron,
 “ that the precipitates were of a blacker
 “ colour and in greater quantity, from the
 “ larger and more compact pieces of bark,
 “ than from the smaller twig-bark.” Pag. 7.

The last would undoubtedly be a strong argument, if the fact was as Dr. Saunders has represented ; but if any faith is to be given to our experiments, the common bark is more astringent than the red : hence, admitting the assertion that the largest pieces of oak-bark are the most astringent, the argument falls to the ground, and there is no analogy in the case. The proof of the
 Doctor's

Doctor's opinion, that the two barks are the produce of the same tree, proved so slight, that he relinquishes the idea in his last edition, and believes the red-bark to be either a variety or species distinct from the quilled. We are ready to give our assent to this opinion, which appears to be confirmed by a number of arguments. The royal medical society at Paris has, since the death of M. Joseph de Jussieu, received several interesting observations relative to the cinchona. This M. Joseph de Jussieu, was brother to the celebrated botanist Bernard de Jussieu, and one of the French academicians who went to Quito in Spanish America, in order to ascertain the figure of the earth. Dr. Antony de Jussieu, his nephew, gave these valuable communications to the society; from which it appears, that there are more species of the cinchona than what M. de la Condamine has described. He speaks of a red, yellow, and knotty bark, all of which have very smooth leaves, purplish-coloured flowers, and an inodorous bark, bitter to the taste, and more or less coloured. The tree that produces the red is said to be exceeding scarce. In the year 1739, M. de Jussieu found it growing in a very few places
in

in the neighbourhood of Loxa. M. de Jussieu seems to have preferred the red-bark ; but it is a well known fact, that the inhabitants of Peru give the preference to the yellow and knotty ; a circumstance which ought to have some weight with those who wish to try a remedy, of which they have had no experience. The yellow and knotty barks are said to be diminishing so fast, that it is to be feared that they will become extinct in that part of the world ; and probably this may be one cause of the late importation of the red species into Europe, rather than any great estimation of its virtues ; which would undoubtedly have occurred to the observation of the inhabitants of Peru long before the present period, if such virtues had existed.

The same communication informs us of a species of white bark, which includes four varieties, all of which have broad, roundish, hairy leaves : the flowers are red, odoriferous, and furnished with hairs on their inside surface. The outer bark has a whitish appearance, and the fruit is longer than that of the former species. The inner leaves in two of these varieties are of a reddish colour. They have a slight bitter taste, and are said
to

to have a febrifuge quality when fresh, but which they soon lose. The other two are white, and their bark insipid, and of no efficacy. The trees that produce the yellow and knotty barks, were found growing in a valley that extends along the chain of the Andes, and in the district of Yungas, which is near it. About Loxa, in the fourth degree of S. lat. M. de Jussieu saw forests of these trees ; and we have the pleasure to learn, that this valuable vegetable has been discovered in about the same degree N. lat.

Don Casimir Ortoga, professor of botany at Madrid, has lately, by order of the Spanish minister for the American department, sent specimens of two species of cinchona to the royal medical society at Paris, which were lately discovered in the province of Santa-Fe in America, 4 deg. and half North lat. One of these species resembles a specimen of red-bark, now in M. de Jussieu's *Hortus Siccus*, which was sent by M. la Condamine from Peru ; the other is a white bark. As a river that runs through the province of Santa-Fe empties itself near the harbour of Carthagena, we may hope to reap the benefit
of

of this discovery *. This is all the information we have been able to collect respecting the different species of bark; and as we can no longer entertain a doubt of there being several species as well as varieties of the cinchona, the probability is, that the red-bark is a different species from the quilled.

The red-bark has hitherto been the subject of few publications. Mr. Rigby, an ingenious surgeon at Norwich, has published a number of cases greatly in its favour; but he relies so much on Dr. Saunders's experiments, as to judge it "unnecessary to give a chemical analysis of it." An apothecary at Bruges has lately published a pamphlet on this article, in the Flemish tongue, but I was not fortunate enough to procure it in Flanders. An ingenious gentleman of Bruges, whom I met with at Ostend, described it as a nonsensical jargon of words; but I must reserve my opinion till I receive the performance, which I hope to do, with some other publications from the Continent, very soon. I know of no other author on

* Vid. Dr. F. Simmons's ingenious Letter to Dr. Saunders, p. 168. last edit.

this subject. Having therefore availed myself of the writings of others in this chapter, I proceed in the next to offer my experiments on this bark, in the same order as I did in the first part of this work on the quilled species.

C H A P. II.

Experiments on the Red Peruvian Bark.

WITH WATER.

Exp. 1. **H**ALF an ounce of genuine red bark, reduced to fine powder; was infused twenty-four hours in eight ounces of pure distilled water. The liquor was found of a slight red brown colour, had a more bitter but less astringent taste than the same experiment with the common bark.

WITH WATER AND HEAT.

Exp. 2. Half an ounce of the same bark, in coarse powder, was boiled in one pound and half of pure distilled water, to eight ounces, then passed through a linen cloth and

D

set

set in a cool place. In twenty-four hours, the liquor was found more opaque than the infusion. Compared with the decoct. cort. com. the taste was bitterer, and the precipitation much more copious. The two decoctions differed in every respect, much more than the two infusions. The resinous matter was so copiously deposited on the sides of the vessel that contained this decoction, that it resembled very much saline crystallizations.

WITH PROOF SPIRIT.

Exp. 3. One ounce of the same bark, in powder, was infused in eight ounces of proof spirit for fourteen days, the vessel being frequently shaken. It was then found of a beautiful dark brown colour, inclining to red, and had a pleasant bitter astringent taste. With water it exhibited the same appearance as the common tincture.

WITH ACIDS.

Exp. 4. One scruple of the red bark in powder, was infused in spt. vitriol. ten. ʒi. for the space of twenty-four hours. The result was similar to the same experiment

with common bark, except that the liquor was a little more tinged with red.

Exp. 5. One scruple of the same bark was infused in aq. fort. dup. $\text{z}i$. In twenty-four hours this experiment exhibited the same phænomena as described in Exp. 4. with common bark, except that the colour inclined more to red.

Exp. 6. One ounce of spt. sal. marin. added to one scruple of the powder of red bark, in twenty-four hours produced a tincture of a reddish brown colour; but on the addition of water, no taste of the bark was perceived, and with alkali, only a very slight bitter taste was produced.

Exp. 7. One ounce of acetum distill. in twenty-fours appeared to have had no effect on one scruple of the powder of red bark.

WITH ALKALIES.

Exp. 8. One scruple of the red bark, with the same quantity of vegetable alkali, was infused in one ounce of water. In twenty-four hours the liquor had acquired but a slight red colour, had no taste of the bark when diluted with water, and on the addition

of acid manifested but a very slight bitter taste.

Exp. 9. One scruple of the same bark was infused in an ounce of water, with a scruple of fossil alkali. The colour of the infusion was a little deeper, but other circumstances as in the 9th Exp. described under the section of quilled bark.

Exp. 10. One ounce of spt. corn. cerv. was added to one scruple of the red bark. The pellicle, precipitation, and other circumstances, differed only in colour from the same Exp. with common bark.

Exp. 11. To one scruple of the red bark in powder, was added one ounce of spt. sal. ammon. c. calce. In twenty-four hours the colour was a beautiful red brown. A precipitation appeared to have taken place on the sides of the vessel. Dilution with water produced no taste of the bark, but the addition of alkali produced a precipitation of a bitter taste.

WITH NEUTRAL SALTS.

Exp. 12. Of the red Peruvian bark and nitre, each one scruple, were infused in one ounce of water for twenty-four hours. The liquor

liquor was scarcely discoloured, and had no taste of the cortex.

Exp. 13. One scruple of the same bark, with a scruple of cream of tartar, was infused in one ounce of water for twenty-four hours; the liquor was transparent, and had a very slight bitter taste. The addition of a few drops of tinct. mart. produced but a very slight blackish tinge.

EXPERIMENTS ON THE SIMPLE INFUSION OF RED BARK.

Exp. 14. To two ounces of the infusion prepared as in Exp. 1. were added gtt. x. of the tinct. martial. The blackness was at first slight, considerably inferior to the same experiment with the infusion of the quilled, and the precipitate by no means so copious*.

* This experiment was repeated in the presence of several chemists, and when compared with the same experiment on the common infusion, it was unanimously agreed that this mixture was considerably the blackest. Dr. Saunders has drawn a different conclusion, but a repetition of this experiment will readily convince any unprejudiced person; and if intensity of blackness is any proof of superiority in astringency, we have in this experiment, a decisive proof of the superior astringency of the quilled bark.

Exp. 15. To two ounces of the same infusion, were added *spt. vitriol. ten. gtt. xx.* The liquor was rendered turbid, let fall a more copious precipitation, and disguised the acid taste more than in the same experiment with the quilled species.

EXPERIMENTS ON THE DECOCTION OF RED BARK.

Exp. 16. To two ounces of the decoction of red bark, were added *gtt. x.* of the tinct. martial. A purple colour was produced, very different from the inky blackness in the preceding experiments, and the liquor continued long without letting fall any precipitate. After standing twenty-four hours, it scarcely could be said to be of a black colour*; and

* It is to be wished, that Dr. Saunders had given us an experiment of this kind: it is one which manifests at once the superior astringency of the common bark, and explains the nature of the astringent principle. The decoction abounds more in resin than the infusion, yet on the addition of chalybeates it manifests less astringency. The conclusion is plain, the resin is not the astringent, but the bitter principle. Dr. Saunders indeed, is not the first author who has mistaken this matter. The ingenious
Dr.

and the difference was more striking betwixt the two species of cortex in this, than in any other experiment before described.

Exp. 17. To two ounces of the decoction were added gtt. xx. of spt. vitriol. ten. The acid taste was more disguised, and the precipitation considerably more copious than in the same experiment with common bark.

Dr. Lewis says, "The astringency of the cortex resides wholly in its resin, which is not soluble in watery liquors." Neumann's Chem. p. 339, Note.

Dr. Percival long ago detected this error; and we cannot help being rather surprised, that Dr. Saunders should not have been acquainted with this discovery, as he speaks of the Doctor in terms of respect due to so accurate a writer, and has taken the 8th Exp. from his works.

We shall here subjoin two experiments, which prove, beyond a doubt, the truth of the remark that the gum is the astringent principle.

Exp. 1. One scruple of the watery extract, was dissolved in one ounce of distilled water. To the mixture were added gtt. v. of the tinct. martial. The liquor immediately became of an inky black colour, greatly superior to that produced by the following,

Exp. 2. One scruple of the resinous extract of bark, was dissolved in one ounce of rectified spirit. To the mixture were added gtt. v. of the tinct. flor. martial. A black colour was produced, but greatly inferior to that produced by the preceding experiment.

EXPERIMENTS ON THE SPIRITUOUS TINCTURE OF RED BARK.

Exp. 18. To one ounce of the tincture, were added gtt. x. of the tinct. martial. The whole became soon of a deep black colour.

Exp. 19. To one ounce of the same tincture, were added gtt. xx. of spt. vitriol. ten. The mixture was rendered turbid: the acid taste scarcely perceptible, and a copious precipitation let fall.

MISCELLANEOUS EXPERIMENTS.

Exp. 20. Four pounds of the best red bark, reduced to coarse powder, were digested with four gallons of rectified spirit, for twenty-four hours, as described under the 20th Exp. with common bark. By evaporation, *twelve* ounces of resinous extract were obtained.

Exp. 21. One pound of the best red bark was boiled in two gallons of water. The liquor strained and evaporated to the common pilular consistence, yielded five ounces and half a dram of gummy extract.

Exp. 22. One dram of lean raw beef, was put into a phial containing two ounces of the
infu-

infusion of red bark, prepared as in Exp. 1. After having stood forty-eight hours in a window, exposed to a south-west aspect, in the month of August, it began to emit bubbles of air, and manifest signs of putrescency; in three hours more it began to smell offensively, the liquor lost its transparency, and in six hours more the meat was perfectly corrupt. —The same quantity of beef, kept as a standard in two ounces of water, was putrid in thirty-six hours.

Exp. 23. Half an ounce of red bark in powder, was infused in four ounces of red port wine. In four days the colour of the liquor appeared the same as at first. The taste was agreeably bitter, and chalybeates rendered the infusion black.

Exp. 24. Half an ounce of red bark in powder, was infused in four ounces of white port wine. In four days the colour inclined to a beautiful red. The liquor had an agreeable bitter taste, and manifested considerable astringency on the addition of chalybeates.

C H A P III.

*Conclusions from the Experiments on the Cortex
Ruber, or Red Peruvian Bark.*

THE same general conclusions may be drawn respecting the nature and properties of the red bark, as we have before attempted on the *cinchona officinalis*. We shall not therefore repeat what we have said in a foregoing chapter, but confine ourselves chiefly to a comparative view of the virtues of each.

Every experiment that we have related, tends to shew the analogy betwixt the two species. We find the red bark, 1. An astringent. 2. A bitter, and 3. An antiseptic.

As these experiments were made conjointly with those on the common bark, we were able to attend minutely to every circumstance which could mark a difference; and we found that the latter manifested greater signs of astringency, and yielded more watery, or gummy extract, whilst the red species abounded

abounded more in resin, and yielded a more copious spirituous extract.

To ascertain the exact quantity which each species yields per pound, will scarcely appear a matter of much importance, as different specimens yield different quantities, according to the quality of the bark.

M. Boulduc obtained from a pound of bark only five drams and a scruple of spirituous extract. Neumann tells us, that “ a pound yielded, with rectified spirit, ten drams and two scruples of resinous; and afterwards, with water, five drams of gummy extract. On applying water at first, says he, I obtained seven drams and a scruple of gummy, and afterwards, by spirit, six drams of resinous extract.” Neumann’s Chemistry, p. 90.

Dr. Lewis tells us, that he obtained a much larger proportion of resinous extract than what Neumann mentions.

According to our experiments, the quilled bark invariably yields more gummy or watery extract than the red, and the latter more spirituous or resinous extract. To ascertain the specific quantity of each is a matter of no importance; we have given the result of our
enqui-

enquiries, under the separate chapter of experiments; and for the benefit of a ready comparifon, fhall fubjoin a view of the fepa-
rate quantities,

Four pounds of red bark,	yield of fpirituous
extract,	twelve ounces,
Ditto of quilled bark,	eight ounces.
One pound of quilled bark,	yields of watery
extract,	five ounces, two drams,
	ʒij. and feven grains.
Ditto of red bark,	five ounces and
	half a dram.

We are forry to be obliged to differ from Dr. Saunders and his friends, on feveral queftions relative to the red bark. Though we believe the reputation of this, or any other medicine is very little concerned by any opinions refpecting its antifeptic virtues, yet, as fome perfons may be difpofed to attribute much to this fupposed quality, it will be neceffary to obferve here, that our experiments prove the red bark to be a very weak antifeptic, confiderably inferior to the quilled bark, and not equal to the *Cinchona Sanctæ Luceæ*, whole powers of preventing putrefaction, in dead animal fubftances, are but weak.

Thefe

These are the conclusions which chemical investigation tends to establish, and a slight comparison will shew how greatly they militate against Dr. Saunders's opinion; but it is not our wish to contrast the results of experiments upon which accuracy and chemical knowledge must decide. When truth is opposed to error, no authority can resist enquiry, and no power prevent detection; but it would be base, it would be ungenerous to pursue discovery to the detraction of merit. The brightest incident in the character of Hippocrates was, that he confessed his own errors. May every modern physician possess the candour of the father of physic, and not be ashamed to acknowledge a mistake into which inattention may have hurried him! From such conduct can we alone expect unanimity and improvement in science. Great minds are above mean actions; and great geniusses superior to illiberal criticisms. A man may have hands to discover inaccuracies, without a head capable of the thought that produced them. Mistake is sometimes the result of exuberant genius, at others the effect of an heated imagination, which misleads the judgment. Cool experience corrects these sallies
of

of the mind; and we are surprised to find opinion change with time. Physicians have not been proof against this fluctility of thought; and even medicine, with all her affected wisdom, bows the slave of fashion.

The bark has long been a fashionable remedy, but the red bark has lately been the *ton*; and we believe it requires nothing more than the sanction of a great name, to bring the Caribbæan bark into vogue; but if the period of its aggrandization should ever arise, we trust its pretensions will be better founded than those of the red bark.

C H A P. IV.

On the Medical Effects of the Red Bark.

THE number of respectable names that are subjoined to Dr. Saunders's publication, makes me proceed with extreme caution to deliver my sentiments on this part of my subject: I am not however without my authority, and names very respectful grace my opinion. Left I should be misunderstood, I think it necessary here to pre-
mise,

mise, that I am not writing against the red bark, or denying the many facts that have given rise to its reputation in one part of this island. I have already endeavoured to shew, that its principles have been mistaken; and as its use has been indiscriminate, no wonder that we should have diversities of opinion. I am willing to allow that it may be preferable to the quilled, in some instances, though not as Dr. Saunders supposed by its superior astringency, but rather on account of its bitterness. In what cases this may give it the preference, is not easy to determine. There are agues which astringents alone, as alum, effectually cure: there are others in which bitters alone, as camomile flowers, absinthium, or gentian, are the sole remedies: in others again, and those most frequent, the conjunction of these principles is necessary. Others yield not to any of these powers, but require the most diffusible stimuli. To explain this curious fact may be difficult, probably past the power of art. I will here hazard a question,—does it not arise from a peculiar modification of debility?

Not willing to admit the universal superiority of the red bark, I will mention a few names,
and

and from them a few cases, in which the quilled proved preferable. My medical friends at Edinburgh, were never able to give assent to the *eclat* which the red bark had gained. My friend, Dr. Black, whose name I cannot mention without the most profound respect, informed me of a very singular case, which happened in the practice of a surgeon of considerable eminence in Edinburgh. A person had been some time afflicted with an ulcer; which discharged a foetid, ill-conditioned pus; he was put under the use of bark, the discharge lessened, and the pus improved. The surgeon happening to get some red bark, the patient was ordered to use it. The wound grew gradually worse, the common bark was had recourse to, and every favourable symptom returned with its use.

The physicians to the royal infirmary at Edinburgh, have now nearly laid aside the use of the red bark. Dr. Hamilton, from whose friendship and judicious practice during three years attendance at the hospital I received great improvement, found the red bark totally inefficacious in the tertians and quartans of last spring. The same thing happened under the practice of Dr. Henry Cullen, and I could bring
several

several practitioners to vouch the same in England. The following case was given me by a London practitioner. "A lady seven months advanced in pregnancy, was seized with an intermittent of the tertian type, and by the advice of her physician took two ounces of the powder of red bark in the course of twenty-four hours. She continued it in large doses for a week, without any effect on the complaint, though it did not purge her. The common bark was had recourse to, and cured the disorder."

We have been told, that the red bark produces wonderful effects on the Continent; but Dr. Sandifort, professor of anatomy at Leyden, informed me, when I visited that place in July last, that he never could find out its efficacy, and now never prescribes it. Holland is the country where agues are endemial; and no doubt the practice and observation of a man of Dr. Sandifort's reputation, must have weight with the impartial public. The physicians at Haerlem (if I am not mistaken) informed me to the same effect. But I met with such unexpected politeness from Dr. Van-Maurum, professor of natural philosophy, and keeper of the cabinet of

E

natural

natural history, that my time was so much taken up in viewing the curiosities of nature and of art, that I forgot for a while the state of medicine. The authority which I have adduced, may plead apology for my apparent scepticism. To depreciate a medicine is not a pleasant office, but to prevent mistaken judgment, correct false opinions, and vindicate the character of an useful medicine, is an employment worthy the pen of every honest physician. The quilled bark appears to me to be unjustly losing ground. When genuine, and in good order, I shall always prefer it as a powerful, grateful, warm astringent. Those who think differently, have a right to act differently. Prescription is a field of liberty, on which every physician may ride his hobby-horse, provided he splashes not his neighbour or the sick, and most undoubtedly he who chuses may ride in red.

SECTION III.

ON THE CINCHONA SANCTÆ LUCIÆ,
QUINQUINA-PITON, QUINQUINA DE LA
MARTINIQUE, CARIBBÆAN, OR NEW-
BARK.

C H A P. I.

The History of the Cinchona Sanctæ Lucie,

IN the month of November 1783, when I was pursuing my medical studies in London, I first met with a specimen of this bark. Mr. Wilson, an ingenious apothecary in Henrietta-street Covent-Garden, communicated some specimens and an account of this vegetable, to a medical society held in Mr. Sheldon's theatre, Great Queen-street, Lincoln's-Inn-Fields. From the account delivered to the society, and from an examination of the fruit of the plant, which was pretty well preserved, there was no doubt but it belonged to the genus cinchona. Most of the eminent botanists in London are agreed

upon this point ; and my learned friend and preceptor, Dr. Hope, professor of botany in the university of Edinburgh, who has had an opportunity of examining this species, informs me, that he is of the same opinion. The colour of this bark is a dark brown, the pieces are of various sizes, some small and thin, rolled up like cinnamon, or the quilled bark : others of a larger kind. Some are covered with a white silver-coloured cuticle others are externally of a much darker colour. When broke, it has a fibrous texture. Its taste is at first astringent, slightly aromatic but when it has remained some time in the mouth, exceedingly bitter, resembling the bitterness of gentian. Its botanical character is thus defined : *Cinchona*. Floribus cymosis. Sanctæ Luciae calyx quinquefidus. Corolla monopetala, infundibuliformis, laciniis linearibus. Pistillum capitatum. Antheræ lineares. Semina multa, alata. Capsula biloculari ovali, striata. Folia oblonga, disticha. Habitat inter nemora, locis umbrosis, præcipuè ripa alicujus rivi.

We have likewise been favoured with the whole account of this vegetable from Mr. Wilson, as received from Mr. Davidson, surgeon.

geon in St. Lucia ; and as the paper is prepared for publication in the Philosophical Transactions, we shall not venture to transcribe it, but beg leave only to present our readers with the following extract.

“ The bark-tree of this island is nearly
 “ about the size of a cherry-tree, seldom
 “ thicker than the thigh, tolerably straight,
 “ the wood light and porous, without any
 “ of the bitterness or astringency of the bark
 “ itself. It delights in a shady situation, the
 “ north-west aspect of hills, under larger
 “ trees, and is generally to be found about
 “ the middle of a hill, near some running
 “ water. The leaves are large, oblong,
 “ opposite, and plain, preserving as well as
 “ the flowers and seeds the bitter taste of
 “ the bark.

“ In the beginning of the rainy season
 (June) the tree puts forth its flowers in
 small tufts. At first they are white, but
 afterwards they turn purplish. The sta-
 mina are five in number, with a single
 style. The germen oblong, bilocular,
 furrowed on each side. It bursts when
 dry, and sheds its two seeds, which are
 covered with a feathery down. The ger-

“ men in the bark of our island of St. Lucia,
 “ appears to be larger than that growing at
 “ Tobago, if I may judge from a drawing
 “ which I have seen. The other botanical
 “ characters correspond. The soil in general
 “ where our bark grows, is a stiff red clay.”

This is all I am able to give of the natural
 history of the *Cinchona Sanctæ Luciae*; but
 though we are so little acquainted with it
 the French appear to have paid attention to
 it some time ago. M. de Badier, an inhabit-
 ant of the island of Guadeloupe, was the
 first person who sent to France an account
 of the bark-tree of Martinique, which
 that island is known under the name
 quinquina-piton. He carried some specimens
 of it into France, and gave them to some
 eminent botanists and chemists, who severally
 made their observations on the nature and
 qualities of this article. M. de Badier likewise
 communicated some important observations
 on the medical virtues of this bark
 from which it appeared, that the surgeons
 and inhabitants had found it peculiarly benefi-
 cial in the bad fevers which rage in the
 climates. M. Descemet, a distinguished botan-
 ical artist, undertook to examine and comp

the genus of this plant, with the description of the common Peruvian bark ; and in a memoir which he gave to the faculty of medicine, he proved the identity of the genus. His description of the fruit of this vegetable, agrees so perfectly with that given by M. de la Condamine, of the fruit of the quinquina du Perou, that it is impossible, adds he, to find any difference. In both, the calyx is *sur le fruit* ; and, as Tournefort says, the calyx becomes the fruit. In both the fruit is oval ; it opens into two half pods, separated by a partition, and lined with a yellow pellicle, smooth and slender, and which appears to be a prolongation of the partition. In both the seeds are flattened and turned backwards. They are both about half a line in diameter, are very slender towards the ends, and thick in the middle, which is of a brown colour, and contains the seed within its thickness : betwixt two pellicles. The seeds which M. de la Condamine has compared with those of the elm, are attached and disposed in the manner of scales, on an oblong placenta, pointed at one end, and obtuse at the other. This placenta is fastened on each side to the small partition. Many

other circumstances are similar, and corroborate the opinion of their being of the same genus. In both, the leaves are opposite; and as M. Descemet had an opportunity of examining a living species of the *cinchona officinalis* in the king of France's garden, he has received every confirmation that he could wish of his assertion.

In the *Histoire des Maladies de Saint Domingue*, Tom. II. pag. 231. we find a letter from M. Poupel Desportes, king's physician in that colony, and correspondent member of the *Academie des Sciences*, to his brother, written in the year 1747; in which he observes, that he had long ago given an account to M. de Jussieu, of three species of bark, growing at St. Domingo, a description of one of which agreed perfectly with that sent from Perou by M. de la Condamine. M. Desportes has named this species "*Trachelium arborescens & fluviatile laurifoliis conjugatis floribus racemosis, seu corymbosis albis capsulis conicis nigris.*" There is no doubt that this vegetable, which is here called *trachelium*, is of the genus of *cinchona*, and the same with what we are describing. M. de la Planche, a gentleman
well

well known for his accuracy in chemical experiments, has given an analysis of the quinquina-piton, which serves to prove the good opinion we have formed of it, and points out the analogy betwixt it, and the common species of Peruvian bark. M. Mallet, Docteur Regent de la Faculté de Medecine, published in the “Memoires de la Seance publique de la Faculté de Medecine,” a memoir sur le quinquina de la Martinique, connu sous le nom de quinquina-piton, an account of which is given in the Journal de Physique Mars 1781 (tom. xvii.) The author there observes, that the quinquina-piton “est large, mince, fibreuse, legere ; depouillee de son epiderme, d’un gris brun fonce, d’une Saveur *excessivement amere*.” A character which corresponds exactly with what we have observed of the cinchona Sanctæ Lucæ. We cannot therefore any longer doubt the identity of this species of bark, with that described by the French writers ; but must think it very extraordinary, that France should so long have enjoyed a valuable remedy, with which we have been hitherto unacquainted. That we may recommend it more particularly to the attention of our countrymen,

countrymen, we shall venture to present the reader with a series of experiments on this subject, observing nearly the same order that we have done in the preceding sections; and we are happy to find, that chemical analysis corroborates the opinion we have formed.

C H A P. II.

Experiments on the Cinchona Sanctæ Luciae, or Caribbæan Bark.

Exp. 1. **T**WO drams of the Caribbæan bark, were infused for twenty-four hours in four ounces of distilled water. The infusion was of a dark brown colour, and had a very bitter taste like the flavour of gentian.

Exp. 2. Two drams of the same bark reduced to coarse powder, were boiled in eight ounces of pure water to four. The liquor was passed through a linen cloth, and set by to cool. It had a brown appearance, more inclining to red or chocolate colour than the infusion, and let fall an exceeding copious precipitation in cooling, resembling saline crys-

crystallizations, and much more copious than those described in Exp. 2. with red bark. The taste was more nauseously bitter than the infusion.

WITH PROOF SPIRIT.

Exp. 3. One dram of the same bark in coarse powder, was infused in two ounces of proof spirit for twelve days. The tincture resembled very much in appearance the common tincture of bark*. Its taste was much more agreeable, than either the infusion or decoction.

WITH ACIDS.

Exp. 4. To one scruple of the same bark, was added one ounce of spt. vitriol. ten. The colour in twenty-four hours was rather deeper, but every other circumstance nearly the same as in Exp. 4. with common bark.

* “ L’esprit de vin agit puissamment sur les deux especes
 “ de quinquina.—La teinture du quinquina-piton est
 “ plus amere, plus foncée en couleur, se trouble d’elle même
 “ au bout de deux jours : ce qui n’arrive plus, lorsqu’elle
 “ a été filtrée. Elle se mele intimement a l’eau sans per-
 “ dre sa nouvelle transparence, and laisse plus que *le quart*
 “ de son poids d’un extrait d’un brun noir luisant, tenace,
 “ presque d’une saveur d’aloës.” M. Mallet.

Exp.

Exp. 5. One scruple of the same in powder, was infused in one ounce of aq. fort. dup. which dissolved this vegetable in the same manner as it did the two former species *.

Exp. 6. One ounce of spt. sal. marin. was added to one scruple of the same powdered bark. In twenty-four hours it was rather of a darker colour, and not so transparent as in the sixth experiment, with the common bark.

Exp. 7. One scruple of the same powdered bark, was infused in one ounce of acetum distill. which acquired little colour in twenty-four hours, but in three days had a bitter taste, probably owing to the evapora-

* “ L’acide nitreux attaque rapidement les substances
 “ vegetales, & particulièrement nos deux especes de quina.
 “ quina. Nous avons mis une egale quantité de ces
 “ deux ecorces a digerer dans cet acide : les deux solutions
 “ ont laissé, apres l’évaporation de toute l’humidité, un
 “ residu jaune léger, spongieux fort acide, animant un
 “ peu d’activité du feu, mais n’y’ exerçant pas la fulguration
 “ qui caractérise les sels nitreux. Les residus, lavés
 “ à l’eau fraîche jusqu’à perte de toute acidité, se trouvent
 “ depouillés de faveur & de principe, entierement
 “ épuisés : & c’est en vain qu’on a cherché de l’alkali
 “ fixe apres l’incineration. Enfin les deux especes de
 “ quinquina, mises en’ digestion, dans de la liqueur alkali-
 “ ne ont donné deux teintures rouges tres limpides.” Ibid.

tion of part of the acid, as the mixture was exposed to the air.

WITH ALKALIES.

Exp. 8. One scruple of the same bark, with the same quantity of vegetable fixed alkali, was infused in one ounce of water. The colour was darker, but other circumstances, similar to Exp. 8. of the preceding sections.

Exp. 9. To one scruple of the same bark, were added one scruple of fossil alkali, and one ounce of water. In twenty-four hours the liquor was of a dark brown colour, had no taste of the bark, but on the addition of acid a bitter taste was produced.

Exp. 10. One scruple of the same bark, infused for twenty-four hours, in one ounce of spt. corn. cervi. exhibited the same appearances as the same experiment with common and red bark. The colour was rather darker, but on the addition of acid, scarcely any bitter taste could be discerned.

Exp. 11. One ounce of spt. sal. ammon. c. calce. was added to one scruple of the same powdered bark. In twenty-four hours the colour was a dark brown, and on the addition
of

of acid, the liquor was rendered turbid, and a copious precipitation, with a bitter taste, produced.

WITH NEUTRAL SALTS.

Exp. 12. To one scruple of the same powdered bark, were added one scruple of nitre, and an ounce of water. In twenty-four hours the colour of the infusion was much superior to the same experiment with common bark; and what appeared rather extraordinary was, that the Surface of the liquor, in three days, became very mouldy, though it had continued in the same place with the other experiments, which were not affected in the same manner.

Exp. 13. One scruple of the same bark, infused with the same quantity of cream of tartar, in one ounce of water, for twenty-four hours, appeared to have yielded none of its virtues to the infusion.

EXPERIMENTS ON THE SIMPLE INFUSION OF CARIBBÆAN BARK.

Exp. 14. To two ounces of the infusion, prepared as in Exp. 2. were added gtt. x. of the tinct. martial. An intense black colour was immediately produced, much superior to the
same

same experiment with either of the other species; and on standing, the precipitation was very copious.

Exp. 15. To two ounces of the infusion, were added gtt. xx. of spt. vitriol. ten. The liquor was immediately rendered turbid, became of a lighter yellow colour, let fall a copious precipitation, and was of a less acid taste than the same experiment with either of the other species.

* EXPERIMENTS ON THE DECOCTION OF
CARIBBÆEN BARK.

Exp. 16. To two ounces of the decoction, were added gtt. x. of the tinct. martial. A black colour was produced, but much inferior to the same experiment with the infusion.

* “ La grande amertume du quinquina-piton masquant
 “ les autres qualités sapides, pour decider s’il possèdoit,
 “ aussi bien que le quinquina du Perou, quelque principe
 “ astringent, nous les avons fait bouillir l’un, & l’autre
 “ dans l’eau non epurée de passy, qui a noirci sur le champ.
 “ Nous les avons fait bouillir ensuite dans du vin rouge,
 “ dont ils ont precipité entierement la partie colorante, &
 “ n’ont laissé chacun que la couleur, & la saveur qui leur
 “ sont particulieres; mais nous avons observé que le
 “ quinquina-piton decomposoit promptement a froid le vin
 “ rouge: ceque ne fait que tres lentement le quinquina
 “ du Perou.” M. Mallet.

Exp.

Exp. 17. To two ounces of the decoction, were added of *spt. vitriol.* ten. gtt. xx. The colour of the liquor was immediately changed to a light brown, and a copious precipitation was produced, which in a short time hardened into pieces of resin, which were not again soluble in the same mixture, even by shaking the phial.

EXPERIMENTS ON THE SPIRITUOUS TINCTURE OF THE CARIBBÆAN BARK.

Exp. 18. To half an ounce of the tincture, prepared as in Exp. 3. were added gtt. v. of the tinct. martial. The black colour produced, was intense, and the precipitation copious.

Exp. 19. To half an ounce of the tincture, were added *spt. vitriol.* ten. gtt. v. The whole became turbid, and the acid taste was scarcely perceptible.

MISCELLANEOUS EXPERIMENTS.

Exp. 20. Half a pound of the cinchona *Sanctæ Luciae*, boiled in four gallons of water, filtered and evaporated to pilular consistence, yielded four ounces of extract.

Exp. 21. One dram of lean raw beef, was suspended in two ounces of the infusion, as
pre-

prepared in Exp. 1. being placed in a window, exposed to a south-west aspect, in fifty hours it began to emit bubbles of air, and manifest signs of putrescency, running through the different stages of putrefaction in about six hours later than the same experiment with red bark.

Exp. 22. Half an ounce of the *Cinchona Sanctæ Luciæ* in powder, was infused in four ounces of red port wine; in four days the liquor had acquired a strong bitter taste, was of a beautiful dark reddish brown colour, and manifested great signs of astringency on the addition of chalybeates.

Exp. 23. Half an ounce of the *Cinchona Sanctæ Luciæ* in powder, was infused in four ounces of white port wine. In four days the colour was dark brown, but the taste vastly inferior to the former infusion.

Exp. 24. One dram of the *Cinchona Sanctæ Luciæ* in powder, was infused in two ounces of rectified spirit of wine. In five days the tincture had acquired a dark brown colour, manifested signs of great astringency on the addition of chalybeates, had a pleasant agreeable taste, mixed uniformly with water, forming on opaque, light-coloured mixture, which let fall a very slight precipitate.

C H A P. III.

Conclusions from the Experiments on the Cinchona Sanctæ Lucie.

WE have hitherto been examining the union of two powerful principles, and investigation here points out to us a combination of active parts, greatly superior to what we have before discovered.

The general conclusions which we have deduced from our experiments in the preceding sections, are equally applicable to the present species of cinchona, which we have demonstrated to be

1. A most powerful astringent.
2. An excessive bitter.
3. An antiseptic.

On comparison, we find its astringency and bitterness greatly superior to the other species of the bark ; and as these are the only active principles that we have been able to detect in the cinchona, we may conclude this species to be possessed of the virtues of the other in a concentered form. Medical
experience

experience confirms this opinion, and we find it producing all the good effects of the bark in a small dose; but at present we speak not of its exhibition in disease. M. Mallet, to whose paper we are under many obligations, has favoured us with some conclusions from his own experiments on this subject, with which we shall beg leave to present the reader. The substance of them is as follows*.

I. Water

* For the amusement of the French reader, we shall subjoin M. Mallet's own words.—“Voici, ce que nous pouvons conclure de cette analyse.

“ 1. L'eau suffit pour extraire les principes des deux
 “ espèces de quinquina, mais a froid, ou aidée de differens
 “ degres de chaleur, son action, & même celle du vin est
 “ plus prompte, & plus marquée sur le quinquina-piton
 “ que sur l'autre. Il y' à cependant, dans le quinquina du
 “ Perou, un principe que l'eau ne peut dissoudre, qui
 “ trouble l'infusion, & la decoction ou il paroît errant, &
 “ qui fait une espèce de lait virginal, grisâtre de la teinture
 “ spiritueuse étendue dans l'eau, mais quel est ce prin-
 “ cipe? le trouble de l'infusion plus marqué dans la de-
 “ coction de ce même quinquina du Perou, la difficulté
 “ que ces liqueurs éprouvent à traverser les filtres, la
 “ limpidité qui leur est procurée par l'addition de l'alkali
 “ fixe, ou de l'esprit de vin, cette même limpidité qui est
 “ constante dans la teinture spiritueuse ou alkaline, tout
 “ prouve qu'il est de nature résineuse. Dans le quin-
 “ quina

1. Water is sufficient to extract the active principles of both species of bark, but whether cold, or aided by different degrees of heat, its action, and even that of wine, is

“ quina-piton, au contraire, tout est soluble dans l'eau ;
 “ l'esprit de vin y trouve un principe qu'il ne peut dis-
 “ fondre, il le depose au bout de deux jours : c'est ce qui
 “ est cause que sa teinture spiritueuse se trouble alors :
 “ mais ce principe surabonde en petite quantité, & paroît
 “ etre de nature gommeuse.

“ 2. Il existe evidemment, dans l'un & dans l'autre,
 “ un principe astringent, qui n'est nullement dû a l'epi-
 “ derme † mais qui appartient en entier a l'ecorce propre-
 “ ment dite, ou il reside.

“ 3. Les deux quinquina ont une odeur de moisi, qui
 “ n'est pas desagréable, qui leur est propre. Mais ce n'est
 “ pas un principe aromatique : on n'y trouve de principe
 “ ni salin, ni ferrugineux : ce qui le constitue essentiel-
 “ lement est un extrait savonneux, astringent, amer, pres-
 “ de moitié plus abondant dans le quinquina-piton que
 “ dans le quinquina du Perou. Ces deux especes sont
 “ donc de même nature mais avec cette difference, que
 “ la resine est surajoutée a la partie savonneuse dans le
 “ quinquina du Perou : & que dans le quinquina-piton
 “ au contraire s'il y'existe un peu de gomme à nud les
 “ principes d'ailleurs y'sont dans un etat de combinaison
 “ plus exact, & y'forment un corps savonneux plus abon-
 “ dant, & plus parfait.” Vid. Journal de Physique, ut
 supra.

† La decoction de l'epiderme du quinquina du Perou ne fait pas
 de l'encre avec les eaux de Passy.

quicker, and more effectual on the quinquina-piton, than on the other. There is nevertheless, in the Peruvian bark, a principle which does not dissolve in water, which disturbs the transparency of the infusion and decoction, where it appears in too great plenty, and makes a kind of milk (*lait virginal*) of a greyish colour, when the spirituous tincture is mixed with water. But what is this principle? The muddiness of the infusion, and the greater want of transparency in the decoction of the Peruvian bark itself, the difficulty which these liquors have in passing through the filtre, the transparency which is occasioned in them by the addition of fixed alkali or spirits of wine, and this transparency itself, which is constant in the spirituous or alkaline tincture, all prove that it is of a resinous nature.

In the quinquina-piton, on the contrary, all is soluble in water: there is in it a principle which spirit of wine cannot dissolve, but which it deposits in about two days: this is the reason why the spirituous tincture lets fall a precipitate. But this principle superabounds in a small quantity, and appears to be of a gummy nature.

2. There exists evidently in both species, an astringent principle, which does not belong to the outer rind, but is lodged in what may properly be called the whole substance of the bark.

3. The two species of quinquina have a mouldy smell, which is not disagreeable, and which is peculiar to them, but it is not an aromatic principle: we could not discover a saline or ferruginous principle: the constituent essential principle is a saponaceous extract, astringent, bitter, and more abundant very near by one half in the quinquina-piton, than in the Peruvian bark.

These two species are then of the same nature, but with this difference, that the resin is over-added to the saponaceous part in the Peruvian bark; and that in the quinquina-piton, on the contrary, there exists a small portion of gum, separate from the other principles, which are there in a state of more exact combination, and form in it a saponaceous body, more abundant and more perfect.

Such are the conclusions which M. Mallet has deduced from his experiments, to which we are inclined to give all due praise, but
cannot

cannot entirely agree with the learned professor. He seems to suppose the gum a principle distinct from the saponaceous part: we believe the latter, or what he calls the saponaceous part, to be nothing more than the astringent gum, which assists the solution of the resin in water, in the same manner as gum arabic does when added to the decoction. Our experiments lead us to agree with him when he asserts, that there exists more gum in the *Cinchona Sanctæ Luciae* than in the common bark; but we have no reason to conclude, that it exists separately from the resin; on the contrary, it appears to be thoroughly conjoined with it, from the great bitterness of the infusion.

In regard to M. Mallet's opinion respecting the aromatic principle, we perfectly assent to it, and believe that no such part exists; as we were never able to detect any thing of the kind by distillation, or other chemical process.

The medical powers of the bark seem to reside in the gum and resin; nor will it appear at all surprising, that such powerful effects result from this combination. The chemical analysis of opium discovers no aro-

matic oil, yet we find it the most effectual stimulant in nature:

Independent of the analogy drawn from the chemical qualities of these two potent remedies, such as each containing an astringent gum and bitter resin, we shall find their medical effects in many respects alike. Much has been written concerning the sedative effects of opium, but late experiments* prove it beyond a doubt stimulant; and those who understand the doctrine of direct and indirect debility, will have no difficulty in explaining, on the most philosophical principles, its action in producing sleep. Large doses of bark frequently produce drowsiness, and in some instances sleep, as we have often had opportunities of observing; but we cannot at present enter into this enquiry: as an antiseptic, this bark is superior to the red, but inferior to the common.

* Vid. Harrison's Thes. Inaug. de Opio.

C H A P. IV.

*On the Medical Effects of the Cinchona Sanctæ
Luciæ, or Caribbæan Bark.*

HAVING, from experiment, acquired some knowledge of the constituent parts of this new species of bark, we shall proceed to treat of its effects in medicine. Our analysis confirms the opinion which we endeavoured to establish; and we have no doubt but the bark of St. Lucia is the same as that described by the French writers. The accounts from Martinique, and Guadeloupe, with the labours of M. Mallet, corroborate this idea.

We have found this bark more abundant than either of the former species in astringent gum and bitter resin; and from this knowledge, we shall not be surprised to find it a very active remedy, in all those diseases which require the use of the cinchona. On this subject we shall not content ourselves with a mere detail of our own experience. M. Mallet informs us, that he tried it in eleven cases, ten of which were tertian fevers, which had
con-

continued for a longer or shorter time; one was of a month, others of two, three, four, or even twelve months standing; all had been treated in the ordinary method, and resisted the use of common Peruvian bark. The eleventh case was a quartan of eight months continuance, in which the common bark had likewise been tried without effect.

In the first three, he prescribed a decoction prepared from two drams of the quinquina-piton, to an English pint of water*, of which the patient took three cupfuls † every hour, which vomited, and purged them all two or three times; but the next day the paroxysms were very short and slight, without any cold fit. In these three cases, M. Mallet could not persuade the patients to repeat the dose, they had conceived such an aversion to the excessive bitterness. He then gave the same bark, to the quantity of a dram in powder, mixed with the syrup of marshmallows, but it produced vomitings and purgings. The next day, however, the paroxysms were scarcely perceptible, but the sick refused to continue the

* Deux gros de quinquina-piton en decoction dans une chopine d'eau.

† Je leur fis prendre en trois verres.

medicine. M. Solier tried this remedy conjointly with M. Mallet, in four other cases; the bolus was used, it prevented the return of a quartan for eight days, but the patient, in this instance, also refused the medicine. In the month of November, 1779, M. Mallet again tried the quinquina-piton, in the quantity of a dram, in the form of bolus, to a young man about eighteen or twenty years of age, who had laboured for a month under a tertian fever, which had resisted the ordinary treatment. On the very first dose the fever ceased entirely, he had no cold fit, and only a slight accession, which terminated in a sweat. He took the same bolus two days afterwards, and had not the slightest return of the complaint. The medicine was omitted, and the patient continued well. M. Mallet advised eight grains of the powder to be taken every day, for a short time. This small dose kept the patient sufficiently open, and he continued well. On the first of December, the same industrious professor, gave the quinquina-piton in the quantity of half a dram, in the form of a bolus, to two other persons affected with tertians, which had resisted the common practice; one for the space of two,

the

the other four months. This dose produced vomitings and purgings. On the first dose, the cold fit disappeared, as in other instances: the patients took two doses successively, with the same effect as the first. One of the persons was perfectly well the next day: the other had only a very slight *ressentiment* next day. Each of the patients took the remedy in the quantity of eight grains for some days, and were perfectly cured.

This is the substance of M. Mallet's experience on the quinquina-piton, from which, we may readily infer the great importance of this remedy. Its activity is manifested by its effects in small doses; but as M. Mallet has given us some conclusions on this subject, we shall lay the substance of them before the reader, and then proceed to relate our own experience on this article. The result of our experiment is, says he,

1. That the quinquina-piton, taken in decoction, prepared by two drams to an English pint of water, and in the dose of one dram, or even half a dram in the form of bolus, is emetic and cathartic.

2. That it cures recent intermittents; that it suspends those which are old, and have, for
a long

a long time, resisted the action of common Peruvian bark ; and we have reason to suppose that it would radically have cured them, if it had been possible for me to have given other two doses to the sick whom I treated, and who would not continue its use.

3. That its action is very quick.

4. Lastly, That the property which it possesses of vomiting and purging, is an advantage which ought to give it the preference to the common bark, in the treatment of intermittent fevers, since it unites the faculty of evacuating the sick, and producing a cure of the fever. By these two properties united, the great inconveniencies of the bark are guarded against. Obstructions, dropxies, cachexy, says M. Mallet, and a variety of other diseases, which are too often the sad consequences of the bark improperly administered, are prevented. If we likewise consider the quinquina-piton in a political view, we believe that, independently of those advantages which we have mentioned, it deserves the attention of government, and that it may become a new branch of commerce to France of great importance *.

* Vid. Journal de Physique, Mars, 1782.

Such is the result of M. Mallet's experience; those who favour the doctrine of obstruction will agree with him, and be disposed to attribute much to the evacuating effects of this remedy; but when we attend to the particulars of his communication, we shall be disposed to think, that smaller doses of the medicine would have produced the same cures with less inconvenience to the patients. Emetics are often effectual remedies; and it undoubtedly is a great advantage of this bark, that it possesses a laxative quality; but it is only in particular cases, that we would wish it to vomit or purge. Several of my friends have been disappointed in their expectations, by giving their patients too large a dose of the *Cinchona Sanctæ Luciæ*, which produced the effects described by M. Mallet. In some of the London hospitals, this species of bark was found to cure several intermittents and obstinate complaints, in doses of a scruple; but as that dose often proved emetic, the medicine was often laid aside too soon.

I have had an opportunity of making several fair trials with it, and was at first, like other practitioners, under some embarrassments, occasioned by its proving emetic, in
smaller

smaller doses than I expected; but I now find the doses of five, eight, or ten grains, repeated at short intervals, produce all the good effects of the largest dose of common or red bark.

A few grains of *canella alba*, or *species aromatica*, make it sit easy on the stomach, in the form of powder or bolus; and the proportion of one dram, or in some cases, half that quantity, infused twelve hours in one pint of water, is sufficiently strong; and a draught composed of one ounce of this cold infusion, with two drams of the spirituous tincture, and a few drops of the tinct. thebaic. produces the best effects. In three quartans, which had withstood the uses of the common and red bark for near three months, eight grains of this medicine, conjoined with five grains of *canella-alba*, taken three times a day, beginning immediately after a fit, and repeating the dose every two hours, on the morning of the day on which the paroxysm was expected, entirely prevented the fit. The patients were ordered to continue the medicine for several days.

In two of the cases, where these directions were observed, the disorder did not return; but

but in the third, the bark being omitted the day before the usual fit, the patient had a slight return of fever, which was removed effectually by repeating the medicine.

In four cases of tertians, which had continued for several weeks, and two of which had resisted bark, bitters, and alum, in large doses, the *Cinchona Sanctæ Luciae* produced speedy cures: but the most surprising instance that I have met with of its good effects, was a case of dyspepsia, or disorder in the stomach.

The symptoms of the disease were complicated: the patient had no desire for food, his countenance was yellow, he had a fixed pain in the right hypochondrium, was troubled with flatulency, and tormented with spasmodic pains in his stomach and bowels; his legs swelled considerably in an evening, and he sometimes awoke suddenly in the night-time, with a difficulty in breathing, and great oppression about the præcordia. He had an habitual obstipatio, and was supposed to labour under a diseased liver. He had taken several medicines without effect, and was thought incurable. He was ordered a slight infusion of this bark, of which he took one ounce, with two drams of the
 spiri-

spirituous tincture, twice a day ; his appetite began to grow better, and it was proposed to increase the strength of the infusion. The proportion of the bark was two drams to eight ounces of water ; at first this increase produced nausea, and a slight degree of purging, but on the addition of seven drops of the tinct. thebaic. the medicine sat easy on the stomach ; and in the course of ten days, the swellings in the legs entirely disappeared, the patient recovered his appetite and strength, to the great surprise of his friends ; and by the assistance of gentle exercise and proper diet, was so well recovered in three weeks, as to be able to undertake a journey to a considerable distance. The yellowness of his countenance was not entirely removed, but the pain in his side considerably abated under the use of the *Cinchona Sanctæ Luciae*, which kept his body gently open, and I am informed that he has omitted his medicines, and continues pretty well.

Since the former part of this work went to the press, the apothecaries in this place have provided themselves with the *Cinchona Sanctæ Luciae*, and I have had an opportunity of trying it in the autumnal diseases of this

G

season.

season. The medicine has answered my most sanguine expectation ; and I shall conclude these remarks with a few cases which happened under my care, and are well known to the medical practitioners of this neighbourhood.

H. C. a labourer in an adjoining village, was seized with a cold fit and shivering, succeeded by heat, and attended with a violent pain in the head, accompanied with sickness, oppression about the præcordia, vomiting and purging. On the third day he took an emetic, which operated well, but his complaints were not relieved. On the eighth day I was desired to visit him. His pulse was then one hundred and twenty in the minute, the pain of his head violent, and the purging not abated ; his stools were copious, and tinged with blood ; his breathing difficult, his body covered over with a clammy sweat, and he complained of extreme weakness, excessive thirst, and want of sleep.

His wife was in the same bed with him, confined by nearly a similar complaint, unattended with purging. They were ordered each tinct. theb. gtt. xxx. at bed-time, and
the

the next day put upon the use of the following mixture :

R. Cinchonæ Sanctæ Luciae ʒij.

Canell. alb.

Cort. aurant. hisp. aa. ʒi. affunde aquæ bullientis ʒxij. macera per horas sex dein colaturæ.

Adde

Conf. cardiac. ʒij.

Tinct. Cinchon. Sanctæ Luciae ʒij. m. fumantur cochl. ij. amp. ʒ^{tia}. vel 4^{ta}. quâque horâ.

This mixture agreed very well with their stomachs ; the pain of the head abated, and they were able to take food. The anodyne was repeated ; they had each a good night ; the man's purging ceased ; his pulse, on the second morning after taking the mixture, was sunk to ninety-four, and he found himself so well as to be able to get out of bed.

The woman complained of nothing but weakness ; was enabled to eat a bit of chicken for dinner ; and having no more return of her complaints, recovered in a few days. Her husband had a slight return of the fever for some evenings, but by the use of the mixture, is now pretty well recovered.

A. B. a labourer in the same parish, had been for some weeks afflicted with an obstinate diarrhœa, which commenced with a febrile paroxysm. He lost his appetite and his strength, complained of pain in his stomach and bowels, and was considerably emaciated :: in this state I ordered him the use of the mixture above prescribed, with the infusion of the *Cinchona Sanctæ Luciæ*. It had the desired effect, and in eight or ten days the patient was so well recovered, as to be able to go about his usual occupations.

E. M. was seized with a cold fit and shivering, succeeded by heat, and attended with sickness, vomitings and purgings. She complained of a violent pain in her head and back, had great depression of spirits, loss of appetite, and prostration of strength. On the ninth day of her complaint, I was desired to visit her. She had been delirious a few hours before I saw her, but gave rational answers to my questions, and complained chiefly of pain in the head. Her pulse was one hundred and twenty, belly regular, and vomitings abated. She had got little sleep since the commencement of her disorder, and had a considerable degree of thirst upon her.

I ordered tinct. theb. gtt. xxx. at bed-time : she got some sleep during the night, and in the morning her pulse had sunk to ninety-eight ; the pain in the head was abated, and she was able to take broths and cordials the next day. The following powder was then prescribed :

R. Cinchonæ Sanctæ Luciæ.

Canell. alb. aa. gr. vij. ft. pulvis 4^{ta}.
quâque horâ ex cyatho theæ melissæ sumendus.

This medicine agreed very well with her stomach: she found her appetite grow better, and was apparently in a fair way of recovery, when she was unfortunately seized with a miscarriage, being in the third month of her pregnancy: this accident had threatened a few days before, but the symptoms had disappeared. On this occurrence she began to be alarmed ; the discharge of blood was very violent, and her attendants began to apprehend immediate danger. Her body was covered over with a cold, clammy sweat, her heart palpitated, and she fancied herself in the agonies of death. I prescribed tinct. theb. gtt. xxx. to be taken immediately, and recommended the free use of port wine and

other cordials. She followed this plan, and in a few hours found herself easier, the palpitation of the heart abated, and she took some broths. At night she repeated the anodyne, and in the morning awoke considerably refreshed. The discharge of blood continued, and she had very little desire for food. She was then ordered the mixture with the infusion, and tinct. Cinch. Sanct. Luciae, as prescribed above, which is the general form I use for paupers: under the use of this, and suitable diet, she gradually gathered strength; and in eight or ten days was so far recovered, as to be enabled to walk out of doors. The discharge entirely abated, and she is now in pretty good health.

S. S. a young woman, aged twenty-two, lately put herself under my care for the cure of a quartan, under which she had laboured fifteen months, except three weeks in the month of June last, when it appeared to have left her; but since that period, it had continued constant in its return. She came to me on the morning of the day on which she expected the fit, which generally commenced about two o'clock in the afternoon. Not thinking it probable that the return of the
fit

fit could be prevented that day by the use of the cinchona, I ordered her a draught with tinct. theb. gtt. xxx. to be taken an hour before the usual return of the paroxysm; but it did not appear to have had any effect, the fit recurred as usual. The next day she was put upon the use of the following powder.

R. Cinchonæ Sanctæ Luciae.

Canellæ albæ aa. gr. viij. m. ft. pulvis, tertiâ vel quartâ quâque horâ ex cyatho infusi chamæmeli usque ad solitum paroxysmi reditum, sumendus.

The first two or three doses agreed very well, but two taken in the morning fasting were rejected by vomiting. The camomile tea being omitted, and the powders taken in a spoonful of water, were retained. She had but a slight return of the next fit, and by the use of the following powder twice a day for ten or twelve days, got perfectly well.

R. Cinchonæ Sanctæ Luciae gr. v.

Spec. aromatic. gr. viij. m. ft. pulvis bis die ex cyatho aquæ sumendus.

This patient had taken large quantities of the bark, with a variety of other medicines, without any effect.

Mr. W. was seized with pains in his head, back and loins, oppression about the præcordia, sickness and loss of appetite. His tongue was parched and dry; he had considerable thirst; his pulse was one hundred and ten; belly regular. In this state he continued for seven days: on the morning of the eighth, I was desired to visit him. He had had a very bad night, was uneasy, and laboured under some degree of dyspnæa. I ordered him a draught, with an infusion of the *Cinchona Sanctæ Lucæ*, and spirituous tincture, twice a day, with an anodyne at night. The medicines had the desired effect; his appetite began to recover; his pulse sunk to its natural standard, and he had no more return of fever. The anodyne was continued for a few nights; and on the fifth day after the use of these medicines, he was so well recovered as to think farther medical assistance unnecessary.

These are the only cases which I shall at present lay before the reader; and as I have never met with an instance in which the *Cinchona Sanctæ Lucæ* failed, when properly administered, I must certainly entertain the most favourable opinion of its efficacy in small doses. The addition of aromatic species,

cies, or canella alba, generally makes it fit
easy on the stomach, and renders it a pleasant,
as well as an effectual medicine.

Only a small quantity of this bark has
been imported into Scotland; but from some
trials made with it at Edinburgh, great ex-
pectations are formed from its general intro-
duction into practice. Dr. Morgan, physi-
cian at Philadelphia in North-America, has
lately read a paper on the virtues of this
bark to the *American Philosophical Society,*
held at Philadelphia, for promoting useful
Knowledge; from which it appears, that it
had proved very effectual in the diseases of
that climate. The medical practitioners in
Barbadoes, Antigua, Grenada, and Tobago,
likewise speak in high terms of its success in
many obstinate diseases, where other barks
had failed. I shall not therefore protract my
account by any farther detail of observations
upon this article, but shall be happy to find
that the opinion I have formed, is confirmed
by the successful practice of the medical
practitioners in this island.

SECTION IV.

GENERAL OBSERVATIONS ON THE BARK.

HAVING related our experiments and observations on the different species of bark with which we are at present acquainted, we shall now proceed to make some general remarks on the use of this remedy.

Ever since the introduction of the bark, practitioners have turned their attention to the various modes of preparation ; they have puzzled themselves respecting its action, and they have severally disagreed in their accounts of its exhibition in disease. To make some cursory observations on these important points, is the intention of this section.

 C H A P. I.
On the Preparations of Bark.

THE experiments which we have made on the different species of cinchona will enable us to reason with some degree of certainty on this important part of our subject.

Acids

Acids, alkalies and neutral salts, have all been mixed with bark ; and the substance of this vegetable has undergone many a tedious process of maceration, decoction, infusion, &c. &c. with these active substances, with a view of receiving activity and strength from such conjunction: but from our experiments it will appear, that these salts are always improperly added to the preparations of bark. We shall therefore now enquire into the officinal preparations, which are “ an extract (L.E.) resin (E.) spirituous tincture (L.E.) tincture in volatile spirit (L.) and compound tincture (E.) It is also an ingredient in the stomachic tincture (E.)” Lewis’s Disp. p. 197.

The soft and hard extracts are prepared with water, boiled with the same bark till the liquor remains transparent when cold, and only differ in point of consistency. The Edinburgh college directs the extract to be prepared by first digesting the bark, in rectified spirits of wine, for four days, then boiling the residuum in water, and evaporating it to the consistence of honey ; after which, the spirit being drawn off from the tincture to the same consistence, the two extracts are
carefully

carefully mixed together, and evaporated to a proper consistence ; so that we have in this preparation all the virtues of the Peruvian bark that can be extracted by water or spirit. Dr. Lewis seems to have been well acquainted with this fact, though he mistook the nature of the principles of the bark. “ In the bark,” says he, “ we may distinguish two kinds of “ tastes, an *astringent* and a *bitter* one ; the “ *former* of which seems to reside in the “ *resinous matter*, and the latter chiefly in the “ *gummy*. The watery extract is moderately “ strong in point of bitterness, but of the “ astringency it has only a small degree. “ The pure resin, on the other hand, is “ strong in astringency, and weak in bitterness. Both qualities are united in the “ present (Edin.) extract, which appears to “ be the best preparation of this kind that “ can be obtained from this valuable drug.” Lewis’s Disp. p. 413.

We entirely agree with the author in his sentiments of the Edinburgh extract, but have already pointed out his mistake of the nature of the bark ; which is indeed surprising, considering the general accuracy of his observations.

Tinctures

Tinctures of the bark have been long in use. The London Pharmacopeia orders four ounces of the bark to two pints of proof spirit. The Edinburgh Dispensatory orders the same quantity of bark to two pints and an half of spirit. These are undoubtedly excellent preparations ; and if the red bark be used, the latter quantity of spirit will be preferable. Some have thought to assist the action of the spirit by the addition of a little fixed alkaline salt, whilst others have added vitriolic acid ; but we have already decried these notions. In the London Dispensatory we have a *tinctura corticis Peruviani volatilis*, which is prepared by infusing four ounces of the bark with two pints of spirit of sal ammoniac. “ This tincture,” says Lewis, “ is
 “ but lightly impregnated with the virtues
 “ of the bark ; and is so acrimonious, that
 “ the largest dose which can with safety be
 “ given of it, can contain only a very small
 “ quantity of the subject. The medicine,
 “ nevertheless,” adds he, “ has its uses, and
 “ may be serviceable in some cases where
 “ the stronger are improper, as in difficulty
 “ of breathing, obstructions, and oppressions
 “ of the breast. Stronger tinctures of this
 “ kind

“ kind may be obtained by means of dulci-
 “ fied spirit of fal ammoniac, or the spirit
 “ prepared with quick-lime. All the three
 “ may be employed where a large quantity
 “ of bark is not required, as at the close of
 “ the cure of intermittents, in weakness of
 “ digestion, attended with a cold sensation
 “ at the stomach, and some fluxes, particu-
 “ larly those from the uterus, where the
 “ circulation is languid, the fibres relaxed,
 “ and where there is a periodical return of
 “ slight feverish complaints. In these cases,
 “ I have often experienced salutary effects
 “ from a tincture in dulcified spirit of fal
 “ ammoniac, given to the quantity of a tea-
 “ spoonful five or six times a day, in any
 “ appropriated vehicles.” Lewis’s Disp. p.
 309.

Notwithstanding the eulogy that the Doc-
 tor has passed upon this preparation, we
 cannot overlook the first part of his account,
 but must believe with him that it is indeed
 a weak preparation of the bark.

The nature of the menstruum should cor-
 respond to the intention of the medicine.
 If we wish to exhibit the bark as an astrin-
 gent, the cold infusion is preferable to any
 other

other preparation. The decoction is often a better stomachic medicine than the infusion; and the tincture in spirit is generally an excellent addition to either, as it unites powerfully both the active principles of the bark. Wine is very much inferior to spirit, but when devoid of acid, may be used with advantage. In the *tinctura corticis Peruviani composita* (Edin.) the addition of snakeroot and gentian was certainly of service, though the college has omitted these ingredients and the tincture, in their last edition of the Dispensatory. Huxham's tincture of the bark appears to be a good preparation, and we have often found the addition of *canella alba* of great service to the tincture, infusion, decoction, or powder of bark.

The extract of bark has lately fallen into disrepute: indeed, like some other preparations of the bark, it has been much misunderstood. Under the same word may be included two preparations very different. The watery extract is chiefly composed of the astringent gum, and the spirituous extract of the bitter resin. This knowledge is of the greatest utility in practice; for although we may commit the mistake with impunity in
the

the common preparations of infusion, decoction, or tincture, yet when we come to exhibit the pure principles of the bark *per se* it is of the utmost consequence to attend to the distinction. The gum, which is soluble in water, is perhaps one of the first astringents in the *Materia Medica*; in practice we should therefore attend to prescription, and specify the extract which we wish to employ. The neglect may be attended with danger to the patient. Let us suppose, for instance; a person in the last stage of a violent diarrhœa, the discharge is very profuse, the patient much reduced, and we wish to exhibit the bark; the extract is fixed upon, as most likely to sit upon the stomach; the resinous or spirituous extract is given, every symptom is aggravated, and the patient purged out of this life, by the ignorance or inattention of his physician. Such might be a patient's fate, whilst the knowledge and just exhibition of the astringent gum would have saved his life. Not, however, to spend more time in conjecturing mistakes which too often occur in real practice, I shall conclude these remarks with observing, that the simple powder of bark is often preferable to any preparation.

C H A P. II.

On the Action of the Bark.

AS the Peruvian bark was first introduced into practice for the cure of a disease, the nature of which had been long misunderstood, it is no wonder that the theory of its action has been obscured.

At first it was confined to the intermittent, but in course of time it was administered in other diseases apparently of a different tendency ; hence, whatever theories had been formed of its *modus operandi* were now deserted. The doctrine of Lector was long an enemy to the bark, even in agues ; and in continued fevers it was thought a poison. Some bold practitioners, however, ventured to give it early in febrile complaints, that raged with violence in hot climates : the best effects ensued from its use, but theory long prevented its exhibition in Europe. The prejudice of opinion began at length to be

H

dispelled,

dispelled, and preparations of the bark gradually crept into use in the low nervous fever. In that species attended with petechiæ, or tendency to putrefaction, it was found particularly serviceable; hence sprang the doctrine of its antiseptic virtues: it was now esteemed a powerful corrector of depraved fluids, and in every case where the humours were supposed to be corrupted, it was boldly exhibited, and with the best effects. Chemical experiment appeared to give great probability to this theory of its action; but by the same investigation we were taught, that the most powerful stimulants were the best antiseptics. The experiments of Sir John Pringle inform us, that volatile alkali is one of the best antiseptics; a fact which at first appeared incredible, as alcalescency was generally esteemed a putrefactive ferment. The doctrine of fever, introduced by Hoffman, and improved upon by Dr. Cullen, seemed to open a new view of the operation of remedies. Debility, the supposed cause of spasm, together with that modification of it, termed atony, was to be cured alone by tonics; hence the Peruvian bark was said by Dr. Cullen to act as a tonic. This was un-

doubtedly

doubtedly a great innovation in practice, and led to an entire new view of disease. The doctrine of crisis, or critical evacuations, received a shock in this explanation; for as Senac observes, “ Absque crisi equidem tolli
 “ febres corticis Peruviani opera plerisque
 “ persuasum est; nam veluti *uno ictu* eas
 “ aliquando eliminat, nec tamen evacuationes
 “ per alvum, aut per urinæ, sudorisque ductus
 “ molitur: eas saltem sibi non occurrisse
 “ multi tradunt*.”

Observations of this kind give great probability to Dr. Cullen’s opinion; and we are inclined to believe, that the bark operates on the solids, and produces its effects by its action on the stomach, without any reference to its being absorbed by the lacteals, or carried into the circulating mass; but it may be worth our while to enquire here into the nature of tonic remedies: in doing this, we must beg leave to make use of Sir Isaac Newton’s rules of philosophizing, and

“ 1. Admit no more causes of things than are sufficient to explain appearances. And

* Senac de Recondit. Nat. Febr. cap. vii. l. 2.

2. To the same effects we must, as far as possible, assign the same causes*.”

Tonic, in the present sense, is nothing more than a remedy that has the power of increasing the tone, or moving powers of the animal machine. Various kinds of food, and medicines produce the same effect. Thus a good dinner, or a glass of wine, adds vigour to the system, and increases the tone or strength of a person previously debilitated. A glass of brandy will have the same effect, though less permanently. And if a dose of bark is found to be equally, or in many cases more effectual, why not conclude that it produces the self-same end, in the self-same manner? The effect of a glass of wine, may be less transitory than that of a glass of brandy, and a dose of bark more permanent than either; but they differ in degree, not in essence. They both act as tonics, and equally deserve that appellation: but no writer, no practitioner in physic, has called a glass of brandy a tonic remedy. In the same manner, light is one of the most powerful tonics of the

* Vid. Newton's Princip. Book III. p. 1.

animal and vegetable kingdoms. Of many vegetables it is a necessary *pabulum vitæ*; without it they pine, wither, debilitate and die: yet no one has styled this a tonic power. It is called a stimulant, and said to operate by its stimulating powers. Are we then to forsake philosophy? Are we to admit diversity of effects from the same cause? or rather, are we to admit one uniform cause, producing the same effects? The distinction into tonics and stimulants may be made by those who love division, for the sake of subtilty; but true philosophy despises what misleads the mind: and when I say a glass of wine stimulates a man to action, I mean the same as if I said it increased his tone or power of action at the time. If a known stimulus produces the same effect as a tonic, I have reason to conclude, it does it in the same manner. Is not this argument supported by just reasoning and true logic? To reason otherwise, is to reason falsely; and to forsake reasoning in physics, is to make medicine rash empiricism. Additional arguments might be brought to support my opinion, and I could add weight to my supposition from analogy. Wherever the bark is required,

direct stimulants are found of great service : thus good living, generous diet and exercise, are constantly prescribed with the use of this remedy : but to point out farther the analogy betwixt the bark and other stimulants, will be unnecessary. From what we have said, it will appear, that the term specific is improperly applied to the action of the Peruvian bark. Its action is the same as other remedies that cure diseases of debility, and is not enveloped in any dark mystery. It is a stimulus that very often is well adapted to disease ; but, we believe, many lives have been lost by its mistaken use. Even the tonic doctrine has been productive of error ; and this remedy has been relied on, where more diffusible stimuli were required. But we shall not attempt in the present page to trace the errors of medicine ; to explain our own doctrine will be employment enough, and that we attempt in the following experiments.

Exp. 1. At seven o'clock in the morning ; when my pulse was at sixty-two in a minute, I took half a dram of common Peruvian bark. Continuing to sit still, and make observations on my pulse, I found that in three minutes
after

after taking the dose, it beat sixty-six, and I began to feel a considerable degree of heat suffuse itself over my face, hands, and whole body. In five minutes more, my pulse rose to sixty-nine, and in ten minutes was at seventy-six, where it continued for near two hours, and then gradually sunk to sixty-four.

Exp. 2. At seven o'clock in the morning, my pulse beating sixty-two in the minute, I repeated the former experiment, with nearly the same result; but when my pulse had sunk to sixty-eight, I repeated the dose of bark. In three minutes, my pulse was seventy-two; in five, seventy-six; and in ten, eighty-four, where it continued near an hour, then gradually sinking to its usual standard, sixty-four or sixty-six.

From these experiments I would infer the direct stimulating power of the bark: the heat, and quickness of the pulse, shew the vigour of the heart to be increased; and the length of time which this change continued, manifests the permanency of the stimulus which produced these effects. The nature of this work will not allow us to pursue this enquiry; otherwise, analogy and successful practice might be brought in support of our

doctrine. The drowfiness and sleep sometimes produced by large doses of bark ; the exhibition of opiates in intermittent fevers, as advised by Dr. Gregory and Dr. Lind ; together with the mode which Dr. Cullen advises, of exhibiting the bark at short intervals before the expected return of a paroxysm, would seem to strengthen our supposition : but the minds of men must be divested of prejudice, before analogies can be admitted, which militate against a favourite hypothesis. The analogy betwixt wine and opiates is now pretty generally allowed ; and we have no doubt but farther analogies will in a short time be universally acknowledged ; and that the specific quality of the bark will be found to reside in its permanent stimulant action on the nervous system.

C H A P I I I.

General Observations on the Use of the Bark in Disease.

FROM the principles which we have attempted to establish on the operation of this remedy, pretty clear ideas may be drawn *à priori*, respecting the diseases in which it will

will be of service. It will not be necessary to enter minutely into this part of our subject; general observations will suffice, and as we speak chiefly from experience, we shall not search for medical authority to support our argument in every instance.

The bark is one of the most powerful remedies with which the world is blessed, but it is nothing more than an auxiliary of health: and without strict attention to other circumstances, its repeated dose is of no avail.

Regimen is its grand assistant, and we may in vain prescribe our medicine without we injoin its aid. No rule, perhaps, is so universal as that which we are able to form on this subject. It is a general rule, as far as I know, without one exception, that whenever the bark is indicated, generous diet will be found useful: but the great point will be, to ascertain the due bounds of this expression, and regulate the proper use of food. The nature of nutriment appears to have been much misunderstood. Some philosophers have contended for a vegetable diet, others an animal, and the wiser for a mixture of both, as the proper food of man. The structure of our bodies, the formation of our teeth,
and

and a variety of other anatomical arguments support this opinion; but even those who argue thus philosophically, seem to entertain false notions on the principle of nutriment. Vegetables have been supposed to contain a peculiar matter of a saccharine nature, which by animal process is converted into gluten, or animal substance; hence patients of debilitated constitutions, and emaciated habits, have been confined to a vegetable diet; and milk*, as containing abundance of this saccharine matter, and partaking, but in a small degree, of the animal nature, has been copiously administered: but we have seen several cases which incline us to believe, that this opinion is not founded in truth. Persons who live much on animal food, and indulge in the use of fermented liquors, are seldom afflicted with those diseases which affect people accustomed to a more spare diet; they are in general much stronger, and only liable

* Notwithstanding what is here said against a milk diet the author confesses to have an high opinion of it in certain cases: but this subject he means to pursue more fully, when he has leisure to compleat his dissertation, which was honoured with one of the Edinburgh Harveian prizes April 12, 1783.

to accidental illnesses of an inflammatory kind. This fact tends to confirm the opinion, that animal food is most nutritious, and a certain daily portion of it appears necessary for the health of the human system. When the strength of the body is impaired by asthenic disease, it becomes more necessary; and in all those cases which require the use of stimulating medicines, the work of the physician will soon be undone by diet of an opposite nature. I have seen a patient just relieved from the most excruciating stomachic complaints by the use of bark, and medicines of a similar nature, thrown into the most convulsive agony by imprudently eating a slice of apple or other raw vegetables. We cannot therefore too strictly enjoin abstinence from this improper food, and strenuously recommend the use of a more generous diet, of that kind of animal food, which the taste of the patient may render most convenient. On several occasions, animal broths may be preferable to solid meat. The stomach is sometimes unable to digest even strong broths. We must then consult the various arts of cookery, and sometimes are obliged to have recourse to vegetables,

tables, all other diet being, in certain cases, of great debility, too stimulating. These are cases which require peculiar attention; and we may depend upon it as a certainty, that our patient is in a fair way of recovery when he can bear generous food, which never should be denied under proper restrictions. The great art is, not to overload the stomach; but so many little circumstances are to be attended to in this respect, that we shall not weary the patience of our reader by a detail of luxurious or culinary rules.

The use of wine, spirits and water, or malt-liquor, may be properly conjoined to that of bark. Care should be taken that each be good of its sort; a mixture of spirits and water generally makes the best beverage. If wine does not turn acid, or strong-beer produce flatulency, small quantities may be used with the greatest advantage.

So much for the regulation of diet.

Exercise is generally a powerful auxiliary to the bark when it can be conveniently used. Its mode may be varied according to the circumstances or disposition of the patient. Riding on horseback, in a carriage, walking or sailing, have their respective advocates.

Having

Having premised thus much on regimen, we shall proceed to speak of some diseases in which the bark is given with success.

Inflammation is commonly attended with so many symptoms which forbid the use of stimulants, that we shall appear at first sight, to have seized the wrong end of nosology, and treat of a disease in which our remedy can never be useful. Inflammation is of various kinds; increased heat in a part, quick strong pulse, and other symptoms of increased action in the system, require the use of antiphlogistics; but even this species of inflammation in its termination, frequently calls for the aid of bark. Gangrene is cured, and sphacelus prevented by its liberal exhibition. Ill conditioned abscesses and foul ulcers often require its use; and there is one peculiar form of local inflammation, in which the cortex has lately been given with incredible advantage.

The *scrophula* or *king's-evil*, has been called one of the endemial maladies of Britain. Its symptoms are various; but the subjects of this dire disease are generally of the most puny and debile constitutions; inflamed eyes are commonly the first, or at least the most obstinate symptoms of the complaint; bleeding,
purging,

purging, and the antiphlogistic regimen never fail to increase the disorder, whilst a contrary method is found of the greatest service.

The *erysipelas* generally occurs as an inflammatory disease; but there is one species of it, which Dr. Cullen calls the phlyctænodes, that is sometimes attended with symptoms of mortification or gangrene: this most commonly happens in warm climates, or in hot seasons. In such cases the bark is the only remedy.

The *quincy*, or *fore-throat* appears in various forms, happening to the robust and healthy of every age and sex. Its most common cause is accidental exposure to cold, and under such circumstances it generally terminates favourably in a few days, without the use of medicine; but there is one species denoted the *putrid*, or *malignant* fore-throat, in which the utmost skill of the physician is required to save the life of the patient.

The reigning symptoms of this complaint are, swelling and discoloration of the tonsils and mucous membrane of the fauces, which is covered with whitish, livid, or ash-coloured spots, and spreading ulcers of a malignant nature.

nature; the patient's breath is extremely foetid and offensive, his pulse is low and weak, and a scarlet eruption generally covers the surface of the body. Dr. Fothergill has shewn the use of bark in this complaint. The decoction or infusion makes a good gargle, but must not supersede the internal use of this remedy.

The *rheumatism* is properly divided into acute and chronic; the former species most commonly occurs after exposure to cold, and is a pure inflammatory disease for some days, when it degenerates into the latter, which is often one of the most afflicting maladies of old age. The external and internal use of stimulants affords relief; and the bark often performs a cure, when other remedies have failed.

The *small-pox* is commonly ushered in with every symptom of increased action, and continues under this form for the first eight days; the suppuration of the pustules commences, and a train of different symptoms begins to appear. In the discreet or regular small-pox the secondary fever is generally slight, sometimes not at all observable. In the confluent, the disease runs a different course, the
pustules

pustules are very numerous, appear flaccid, never assume that turgid elevated appearance which distinguishes the regular. The fever is of the low nervous kind, petechiæ appear in various parts of the body, and every symptom of debility prevails. In such instances, the bark has been strenuously recommended by the late learned Professor Monro, and daily practice evinces the utility of his discovery.

Hæmorrhages have, since the days of Stahl, commonly been considered as phlogistic diseases, and in almost every instance evacuation has been prescribed; but I have lately known several instances of the good effects of a contrary treatment. A case of this kind occurred to my knowledge. A gentleman who had, at the age of sixty, entered on an abstemious course of life, and low diet, was seized with a profuse bleeding from the nose; to stop which, the practitioner bled him at the arm, the disorder increased, the blood-letting was repeated, and every symptom aggravated, till at length the weakness of the patient pointed out the error in practice; a contrary method was tried, and the patient recovered under the use of bark and wine. I could relate several instances of the bad effects of
the

the antiphlogistic treatment of hæmorrhagy, but it would lead me into too wide a field. A due discrimination betwixt active and passive discharges of blood, marks the experienced physician.

Hæmoptysis, or *spitting of blood*, has long been considered as one of the most incurable diseases; and the generality of practitioners will agree with me that they have seen few instances of genuine idiopathic hæmoptysis treated in the common method, terminate favourably: a phthisis is almost a certain consequence. I have lately paid considerable attention to this fatal complaint, and have ventured in another work, to differ from the common opinion delivered by authors.

Experience seems to have convinced some very attentive observers upon the Continent, of the impropriety of the common mode of treatment in hæmoptysis. Speaking on this subject, Lieutaud says, “*venæsectio, ineunte*
 “*morbo, in nonnullis proficua censetur: alias*
 “*inutilem operam navat, vel noxam infert:*
 “*hanc præcipue solent imperiti, in hacce*
 “*febris acutæ specie, quæ à tuberculorum*
 “*inflammatione, & suppuratione sobolescit:*
 “*sed ab hac intempestiva sanguinis missione,*
 I “*pluries*

“ pluries iterata, ad æthereas sedes properasse
 “ ægros pluries vidisse memini *.

It may perhaps be objected, that Lieutaud here speaks against blood-letting in the more confirmed stage of phthisis, but the learned Ludwigius, has given his opinion in more expressive language. “ Fateor in his corporis
 “ dispositionibus, sæpe nullum auxilium
 “ afferendum esse. Si enim ex *debilitate ner-*
 “ *vosa*, vera vis sanguificationis & in optima
 “ sæpe ætatis vigore, deficit, *morbo hæmop-*
 “ *toico*, casu superveniente, non solum post
 “ venæsectionem repetitam, tenuis sanguis
 “ porro effluit, & sæpe continuatæ eruptionis
 “ per hæmoptoem causa est, sed & tum san-
 “ guinis effluxus, solo exquisitissimo diætæ
 “ regimine cohibetur, vera circulationis vis,
 “ & boni cruoris, reliquorumque humorum
 “ elaboratio nunquam restituitur: languor
 “ corporis subinde inducitur, & tabes inevi-
 “ tabilis crebra reddit juvenum funera. Sic
 “ sæpe in primo morbi hæmoptoici insultu,
 “ languida corporis dispositione visa, tristem
 “ sæpe prognosin enuntiat medicus, & sanos
 “ sæpe juvenes ad hos morbos dispositos ex-

* Lieut. de Morb. intern. pect. c. depthin.

“ hortatur;

“ hortatur, ut corporis vigorem universum
 “ accurata diætâ sustineant, ne levi sæpius
 “ hæmoptoes insultu affecti, ex imbecillitate
 “ pereant *.

From the observations of these great men, conjoined to our own experience, we will venture to prescribe the use of bark and its auxiliaries, in most cases of this disease.

The *Menorrhagia* is a disease peculiar to the female sex. The increased discharge, which characterises this complaint, occurs most commonly to women previously exposed to powerful debilitating causes; and in some cases which I have lately attended, the bark produced cures when other remedies had failed. The practice of several of my medical friends confirms this observation.

There is another female complaint, apparently of an opposite nature, but often proceeding from the same causes, in which the bark is of acknowledged use. The *Amenorrhœa* occurs to women previously debilitated, and can only be effectually cured by the bark, generous diet, and the free use of exercise.

* D. Christ. Gottlieb. Ludwigi Advers. p. 155. Vol. I.

Diarrhœa is often a temporary disease, and frequently is cured without the aid of medicine; but sometimes it becomes very violent, arises from every slight debilitating cause applied to the alimentary canal, and in such cases threatens great danger. The bark, as liable to run off by stool, has not been commonly administered in these cases; but I have seen examples of its efficacy, one of which is recorded in the chapter on the medical effects of the *Cinchona Sanctæ Lucæ*.

In that distressing congeries of complaints, which Dr. Cullen has so elegantly described under the title of *Dyspepsia*, or *Affections of the Stomach*, our medicine affords the greatest relief, and is seldom found to fail in performing a speedy cure. Dr. Home informed us, in his clinical lectures in the year 1782, that he had laboured under dyspeptic complaints for ten years, had taken a variety of medicines without effect; but at length, having recourse to the bark, was effectually cured. I have been witness to several remarkable examples of its efficacy in public and private practice. The *Gout* frequently makes its appearance under such a form, and produces the most dreadful effects in its
lingering

lingering consequences ; in these instances the cinchona may generally be employed with great advantage.

Asthma is a disease which appears to be justly distinguished into species, requiring a different mode of treatment. When it occurs to the sanguineous or plethoric habit, blood-letting and emetics prove serviceable ; but the spasmodic asthma generally occurs to persons of the most debilitated constitutions, and is only to be cured by the use of bark, opiates, and other stimulants.

Fever has been considered as a general inflammation : pyrexia or increased heat makes a principal part of its character ; and in its treatment, every heating thing has been carefully avoided. The want of a due discrimination betwixt the low, nervous, and inflammatory fever, has given rise to the indiscriminate use of the antiphlogistic regimen, which has proved the bane of medicine and recovery. Some facts, some astonishing facts, within these few years, have led to the free use of stimulants in typhus, or fevers of the low, nervous type. Dr. Huxham long ago introduced the use of bark in fevers attended with petechiæ, and other symptoms of putridity ;

tridity; and we are happy in one instance, of erroneous theory having produced good practice. The doctrine of antiseptics introduced the use of remedies which cured the patient by deceiving the physician: the bark, which was swallowed to sweeten corrupted fluids, stamped vitality upon the solids, and stimulants are now acknowledged the best antiseptics. The great fatality of typhus under bad management, and its happy termination under the liberal use of bark and other stimulants, establish beyond a doubt the utility of this remedy in that species of fever.

The *Ague*, or intermittent fever, has been peculiarly favourable to our remedy. It first introduced the cinchona to our acquaintance, and gained it that attention which it so highly deserves. Intermittent fevers are distinguished into various species, and are all characterized by having paroxysms or accessions at stated periods, with manifest intermissions or remissions. The period of accession is marked by a singular affection of the system, called the cold fit; in which the patient complains of a sensation of cold, though his skin, to the touch of another person,

person, or the thermometer, manifests in general, increased heat: this sensation, which is attended with a shaking or trembling of the limbs and different parts of the body, and continues for a longer or shorter time, according to the nature and violence of the disease, is succeeded by what is called the hot fit; in which the patient complains of heat, head-ach, thirst, and every symptom of increased action; for some time the skin continues parched and dry, but on the coming on of a sweat, those disagreeable symptoms disappear, and the patient is restored to what may be called, his usual state of health; this continues till the next return of the paroxysm, which is commonly a repetition of the circumstances described. When the distance, or interval from one paroxysm to another, is forty-eight hours, the disease is called a *tertian*, and this form is observed to come on pretty constantly at noon. The *quartan* observes an interval of seventy-two hours, and has its accessions in the afternoon. The *quotidian* has an interval of twenty-four hours betwixt each fit, and its paroxysms are observed to happen in the morning. This is the common division of intermittents into

species,

species, which may generally be pretty well marked; each species has its varieties, and authors have treated of these various forms with great subtilty.

Dr. Cleghorn, in his *Diseases of Minorca*, has communicated several valuable and curious observations on this subject, which have been refined upon by Dr. Cullen, who maintains that all fevers consist of repeated paroxysms. The *remittent fever* is, according to him, nothing more than an intermittent with a short interval, or a continued fever with exacerbations and remissions remarkably manifest.

These are the fevers in which practitioners seem thoroughly agreed about the use of bark, and no theory now dares to exclude the free administration of this remedy in these diseases: accordingly we find all the late authors on fevers, recommending careful and attentive observation to these circumstances.

Continued fevers are those which have no intermission, do not arise from marsh miasms, which, according to Dr. Cullen, is always the cause of the former, but yet are supposed to have regular exacerbations or remissions twice a day. It would lead us too far astray

to pursue the subject of fever much farther : we shall therefore content ourselves with observing, that the *typhus* or *low nervous fever* is that in which the bark will be found most efficacious : regardless of exacerbation or remission, we must exhibit our medicine freely. The histories of diseases in warm climates teach us, that delay is dangerous ; without waiting for symptoms of putridity, we must attack the disease, even in its greatest rage of heat, and conquer that destructive foe of health, debility.

The *hectic fever* has long withstood the use of medicine, and practitioners have differed widely in their accounts of the efficacy of bark in this disease ; but from some late instances, we are inclined to believe, that it may be employed with success even in the advanced stages of a phthisis, when the exacerbations of this fever are most remarkable. In this opinion we are confirmed by the observation of the sagacious De Haen, whose words we use : “ *Mirum profecto fuit intra quam breves dies collapsæ vires resurgere, febris decreveret, revivisceret, appetitus, defœdato vultui color rediret nilorquæ & nocturnæ anxietates rarefcerent, blandi*

“ obreperent somni, sputisque pectus se com-
 “ mode evacualet *.”

We shall here conclude our remarks on the use of the bark. A variety of other diseases, such as palsy, dropsy, hysteria, &c. might have been mentioned; but from what we have said, it will appear, that this remedy is properly employed in all diseases of direct debility: and we would wish it to be understood, that what we have advanced respecting the cinchona as a genus, may, as far as our own limited experience leads, be extended to that species which it is the peculiar object of this little work to recommend. Some of my readers may, perhaps, blame me, for having consumed so much time on one article of the materia medica; but I am persuaded, that I ought to apologize rather for the hasty manner in which these thoughts have been sent into the world, than for the attention bestowed upon a subject of such importance. Inaccuracies may occur, but a candid reader will readily overlook the imperfections in the intention of the author. “Solent autem homines,” says the immortal Verulam

* De Haen de Virtute Sing. quor. Med. cap. xxvii.

“ naturam tanquam ex præalta Turri, & à
“ longe despicere, & circa generalia nimium
“ occupari : quando, si descendere placuerit,
“ & ad particularia accedere, resque ipsas
“ attentius & diligentius inspicere, magis
“ vera & utilis foret comprehensio.” Bacon,
l. ii. cap. i.

T H E E N D.

